Project Narrative
Dickson Warehouse Waste Characterization and RCRA Soil Stabilization
Li Tungsten Superfund Site
Glen Cove, New York

Revision 1

February 2008

Prepared By:

URS Corporation
Foster Plaza 4
501 Holiday Drive, Suite 300
Pittsburgh, Pennsylvania 15220

Introduction

The Li Tungsten Cooperative Group desires waste acceptance of approximately 1,500 cubic yards (approximately 2,280 tons) of non-hazardous soils meeting both the Alternative LDR of 7.5 mg/L and the RCRA characteristic of 5.0 mg/L for lead. Documentation for waste acceptance (Pennsylvania Form U, Certificate of Non-Hazardous Waste, PCB Certification, and Generator's Waste Profile Sheet) can be found in Attachment A.

Site Background

The Li Tungsten Superfund Site is located in the City of Glen Cove, Nassau County, New York, and includes the former Li Tungsten Corporation facility at Herbhill Road and Dickson Lane. As a result of processing of ores at the facility on the Li Tungsten property, and the subsequent disposal of portions of the byproducts of that processing, elevated levels of radiation and certain metals had come to be present at or in the vicinity of the Li Tungsten property. The property is approximately 26 acres.

From April 2006 to August 2007, "ECC" activities based on a remedy selected in the 1999 ROD were performed on Parcels B and C of the Li Tungsten Superfund Site that included the excavation and segregation of contaminated soils. After the "ECC" operation, approximately 1,500 cubic yards of RCRA contaminated soils, 30 cubic yards of metals contaminated soils, 555 cubic yards of PCB contaminated soils, and 1,895 cubic yards of radiological contaminated soil remained stockpiled in the Dickson Warehouse located on Parcel C of the Li Tungsten Superfund Site. The PCB contaminated soils and the radiological contaminated soils were loaded during mid November (from the 13th through the 20th), and then transported, and disposed of off-site at appropriate disposal facilities.

Waste Characterization Sampling

URS performed waste characterization sampling on December 21, 2007 in accordance with the Waste Characterization Sampling Plan dated December18, 2007 (see Attachment B). Six (6) grab samples, one from each stockpile was collected and analyzed for volatile organics. Five (5) discrete grab samples were collected from each stockpile. The thirty (30) discrete grab samples were composited into three (3) composite samples each representing 500 cubic yards. These samples were analyzed for General Chemistry, Metals, PCBs, Pesticides, Semi-Volatiles, Herbicides, and Gamma Spectrometry. Analytical results are presented in Attachment C. The sample results for these samples met the waste acceptance criteria for GROWS and Tulleytown Landfills.

Treatability Study

A Treatability Study was conducted from November 17 to November 20, 2007 in accordance with Section 4.3 of the Remedial Action Work Plan, a copy (without appendices) of which is included in Attachment D. 500 cubic yards of RCRA soil was laid out in a 6-inch lift on the concrete floor of the Dickson Warehouse. Prior to stabilization, thirty (30) discrete grab samples where collected in a triangular grid from the surface of the stockpile and combined into three (3) composite samples. URS utilized Calciment® in one-ton super sacks to stabilize the RCRA lead soil (RCRA soil). Based upon historical total and TCLP lead data, a recipe of Calciment® at a rate of 5% by weight was expected to be sufficient to stabilize the lead to below both the Alternative Universal Treatment Standard (UTS) as an Underlying Hazardous Constituent (UHC) of 7.5 mg/L TCLP and the RCRA characteristic of 5.0 mg/L for lead.

The Calciment® was spread on the surface of the lift utilizing a loader and excavator. Once the Calciment® was spread over the surface area of the stockpile, the Calciment® was tilled into the soil using a dozer and "tumbled" using a loader. The lift was visually inspected to confirm that the soil and Calciment® had been thoroughly mixed. Post-treatment samples were collected. Thirty (30) discrete grab samples were collected in a triangular grid from the surface of the stockpile and combined into six (6) composite samples. The samples were analyzed for total and TCLP lead.

RCRA Soil Stabilization Work Plan

Based upon the results of the Treatability Study (two of the six samples did not meet the treatment standard), a RCRA Soil Stabilization Plan was developed (see Attachment E). It was determined that the Calciment® additive would be increased to 7.5% by weight and a more rigorous mixing would be implemented utilizing the same equipment and method but consisting of a longer blending duration and smaller batches of material (250 cubic yards versus 500 cubic yards). The plan was submitted to the USEPA for review and approval. The USEPA approved the RCRA Soil Stabilization Plan with comments on November 29, 2007. The Plan was modified to address those comments and was finalized on December 3, 2007.

URS returned to the Dickson Warehouse on December 3, 2007 to re-treat the initial 500 cubic yards treated in the Treatability Study and completed stabilization of the remaining 1,000 cubic yards of material. The stabilization operation was completed by December 6, 2007.

URS added an additional 2.5% of Calciment® by weight to the 500 cubic yards of material treated in the Treatability Study in 250 cubic yard batches. Three composite samples comprising five (5) grab samples each were collected from each 250 cubic yard batch. The samples were analyzed for Total and TCLP lead analysis. The material was then placed into 250 cubic yard stockpiles (1 and 2).

URS proceeded to stabilize the remaining 1,000 cubic yards of material in 250 cubic yard batches. Fifteen (15) discrete grab samples were collected in a triangular grid from the surface of the 250 cubic yard lift and then combined into three (3) composite samples. The lift was then placed into a stockpile. The process was repeated until all of the RCRA soil was stabilized. The stabilization process generated six (6) 250 cubic yard stockpiles all staged in the Dickson Warehouse.

The eighteen (18) samples collected (three samples for each stockpile) were analyzed for total and TCLP lead. The TCLP lead results were reviewed and compared to the treatment standard of the lesser of the Alternative UTS as a UHC of 7.5 mg/L TCLP and the RCRA characteristic of 5.0 mg/L TCLP for lead. All the samples met the treatment standard (see Attachment F.)

Future Offsite Disposal

Once approved, the material will be loaded and shipped off-site for disposal.

Attachment A

- **Pennsylvania Form U**
- **PCB Certification**
- **Generator's Waste Profile Sheet**

2540-PM-BWM0395 7/2006
Form

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

FORM U
REQUEST TO PROCESS OR DISPOSE OF RESIDUAL WASTE

This form must be fully and accurately completed. All required information must be typed or legibly printed in the spaces provided. If additional space is necessary, identify each attached sheet as Form U, reference the item number and identify the date prepared. The date on attached sheets needs to match the date noted below.

DEP USE ONLY
Date Received & General Notes

Date Prepared/Revised February 27, 2008

SECTION A. LANDFILL CLIENT (LANDFILL OR PROCESSING FACILITY OWNER) INFORMATION

DEP Client ID# | **DEP Client Type / Code**

Organization Name or Registered Fictitious Name
Waste Management Disposal Services of PA, Inc.

SECTION B. LANDFILL SITE (LANDFILL OR PROCESSING FACILITY) INFORMATION

DEP Site ID# | **Site Name**: G.R.O.W.S. Landfill | **Landfill Permit ID#**: 100148

Site Contact Last Name | **First Name** | **MI** | **Suffix**

Site Contact Title | **Site Contact Email Address**

SECTION C. GENERATOR CLIENT (GENERATOR OF THE WASTE) INFORMATION

Company Name: Li Tungsten Cooperative Group | **DEP Generator ID#**

Company Contact Last Name: Bertaut | **First Name**: Edgard | **MI** | **Suffix**

Company Mailing Address Line 1: c/o TDY Industries, Inc. | **Company Mailing Address Line 2**: 1000 Six PPG Place

Company Address Last Line – City: Pittsburgh | **State**: PA | **Zip+4**: 15222-5479 | **Country**: USA

Company Phone | **Ext** | **Company Email Address**: 301-526-1710 | ebertaut@alleghenytechnologies.com

Company Contact Last Name | **First Name** | **MI** | **Suffix**

Contact Phone | **Ext** | **Contact Email Address**

If a Subsidiary, Name of Parent Company

Is the waste generated at the Company Mailing Address (noted above)? ☐ Yes ☒ No

If 'No', describe location of waste generation and storage.
Parcel B and C – Dickson Warehouse - Li Tungsten Superfund Site

Township Glen Cove | **County** Nassau | **State** NY

SECTION D. WASTE DESCRIPTION

Residual Waste Code	Residual Waste Code Description	Amount	Unit of Measure	Time Frame
900	Contaminated Soil and Debris	2,280	☐ cu yd ☐ gal ☐ lb ☒ ton	☒ One Time

1. GENERAL PROPERTIES

a. pH Range 9.82 to 11.45 Based on analysis. See Attached

b. Physical State
- ☐ Liquid Waste (EPA Method 9095)
- ☒ Solid (EPA Method 9095)
- ☐ Gas (ambient temperature & pressure)

c. Physical Appearance **Color** Grayish brown to black **Odor** None

Number of Solid or Liquid Phases of Separation 1

Describe each phase of separation.
None – Solid Material

d. **Attached is information from the generator certifying that a hazardous waste determination has been done and that the waste is not hazardous waste as defined in 40 CFR 261, as incorporated by reference at 25 Pa. Code 261a.1.**
Caution: If 'No', the application form is incomplete. ☒ Yes ☐ No

e. **Is the waste treated hazardous waste?** ☒ Yes ☐ No
If 'Yes', list the hazardous waste code(s) that apply to the hazardous waste before treatment.
D008
If 'Yes', what treatment option was selected?
Blending Calciment® to stabilize/fixate the lead. See the attached Soil Stabilization Plan and Report.
What limit was required to be met by the treatment option?
0.75 mg/l TCLP Lead
Provided a copy of the certification required under 40 CFR 268.7(a), as incorporated by reference at 25 Pa. Code 268a.1, that the waste meets all the land disposal restriction requirements, as specified in 40 CFR Part 268, Subpart D (Land Disposal Restrictions-Treatment Standards). ☒ Yes ☐ No

f. **Has the waste been delisted as a hazardous waste by DEP or US EPA?** ☐ Yes ☐ No ☒ N/A

g. **Has the waste been accepted for disposal/processing at another Pennsylvania facility?** ☐ Yes ☒ No
If 'Yes', list the facility permit ID number(s).

h. **Has an application for disposal/processing of the waste at another Pennsylvania facility been submitted?** ☐ Yes ☒ No
If 'Yes', list the facility permit ID number(s).

2. Chemical Analysis Attachments

a. **Has a detailed physical and chemical characterization of the waste and its leachate been conducted**? ☒ Yes ☐ No
If 'No', provide detailed explanation supporting use of generator knowledge in lieu of actual chemical analysis.

If 'Yes', attached is a description of the waste sampling method, in accordance with the waste sampling plan as required in §271.611(a)(3) or §287.132(a)(3). ☒ Yes ☐ No

b. **Laboratory Accreditation Number** 65-00282

3. Process Description & Schematic Attachments

a. **Attached is a detailed description of the manufacturing and/or pollution control processes producing the waste.** ☐ Yes ☒ No
If 'No', provide explanation.
Waste was generated by soil excavation for site remediation.

b. **Attached is a schematic of the manufacturing and/or pollution control processes producing the waste.** ☐ Yes ☒ No
If 'No', provide explanation.
Waste was generated by soil excavation for site remediation.

c. **Attached is the substantiation for a confidentiality claim (if portions of the information submitted are confidential).** ☐ Yes ☒ No ☐ N/A

4. Chemical Analysis Waiver

Categories of residual wastes that qualify for the waiving of chemical analysis by the Department are listed below. Check the appropriate box(es) that match the waste proposed to be accepted for disposal.

- ☐ burnt demolition debris
- ☐ cured rubber scrap
- ☐ fabric/cloth/textile/leather wastes (excluding treatment sludges)
- ☐ food wastes (excluding treatment sludges)
- ☐ metal scrap (excluding powdered grindings or if contaminated with fluids or oils)
- ☐ shingle scrap
- ☐ waste plastic (excluding extrusion manufacturing & uncured resins)
- ☐ Other (explain)
- ☐ carpet scraps
- ☐ empty containers (uncontaminated)
- ☐ fiberglass insulation scrap
- ☐ hot drained used oil filters (non-terne plated)
- ☐ sawdust (excluding treated wood)
- ☐ waste paper
- ☐ wood wastes (excluding treated wood)

All waste types not listed above must be approved in writing in the permit by the Department prior to processing or disposal facility acceptance.

SECTION E. PROPOSED PROCESSING, STORAGE AND/OR DISPOSAL METHOD

Will any special handling procedures (besides direct disposal) described in the waste acceptance plan, be used when managing the waste? ☐ Yes ☒ No
If 'Yes', describe.

Is this material re-used for construction or operation of the facility? ☐ Yes ☒ No
If Yes', describe.

SECTION F. SOURCE REDUCTION STRATEGY

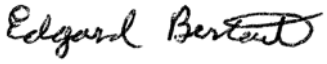
Form 25R must be completed by the generator and attached to this application unless waived in the instructions to that form.

Form 25R attached. ☐ Yes ☐ No ☒ Waived

SECTION G. CERTIFICATION OF PROCESSING OR DISPOSAL FACILITY

I hereby certify that the statements of fact contained therein are true and correct to the best of my knowledge, information and belief. This statement and verification is made subject to the penalties of 18 Pa. C.S.A. Section 4904, relating to un-sworn falsification to authorities.

Name of Responsible Official	**Title**
Edgard Bertaut	Senior Environmental Manager



February 27, 2008

Signature **Date**

2540-PM-BWM0395 7/2006
Form

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Organization Name or Registered Fictitious Name
Waste Management Disposal Services of PA, Inc.

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DEP Site ID# | **Site Name**: Tullytown Resource Recovery Facility | **Landfill Permit ID#**: 101494

Site Contact Last Name | **First Name** | **MI** | **Suffix**

Site Contact Title | **Site Contact Email Address**

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☒ Solid (EPA Method 9095)
☐ Gas (ambient temperature & pressure)

c. Physical Appearance
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Number of Solid or Liquid Phases of Separation 1
Describe each phase of separation.
None – Solid Material

d. **Attached is information from the generator certifying that a hazardous waste determination has been done and that the waste is not hazardous waste as defined in 40 CFR 261, as incorporated by reference at 25 Pa. Code 261a.1.**
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What limit was required to be met by the treatment option?
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f. **Has the waste been delisted as a hazardous waste by DEP or US EPA?** ☐ Yes ☐ No ☒ N/A

g. **Has the waste been accepted for disposal/processing at another Pennsylvania facility?** ☐ Yes ☒ No
If 'Yes', list the facility permit ID number(s).

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a. **Has a detailed physical and chemical characterization of the waste and its leachate been conducted**? ☒ Yes ☐ No
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- ☐ waste plastic (excluding extrusion manufacturing & uncured resins)
- ☐ Other (explain)
- ☐ carpet scraps
- ☐ empty containers (uncontaminated)
- ☐ fiberglass insulation scrap
- ☐ hot drained used oil filters (non-terne plated)
- ☐ sawdust (excluding treated wood)
- ☐ waste paper
- ☐ wood wastes (excluding treated wood)

All waste types not listed above must be approved in writing in the permit by the Department prior to processing or disposal facility acceptance.

SECTION E. PROPOSED PROCESSING, STORAGE AND/OR DISPOSAL METHOD

Will any special handling procedures (besides direct disposal) described in the waste acceptance plan, be used when managing the waste? ☐ Yes ☒ No
If 'Yes', describe.

Is this material re-used for construction or operation of the facility? ☐ Yes ☒ No
If Yes', describe.

SECTION F. SOURCE REDUCTION STRATEGY

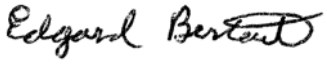
Form 25R must be completed by the generator and attached to this application unless waived in the instructions to that form.

Form 25R attached. ☐ Yes ☐ No ☒ Waived

SECTION G. CERTIFICATION OF PROCESSING OR DISPOSAL FACILITY

I hereby certify that the statements of fact contained therein are true and correct to the best of my knowledge, information and belief. This statement and verification is made subject to the penalties of 18 Pa. C.S.A. Section 4904, relating to un-sworn falsification to authorities.

Name of Responsible Official	**Title**
Edgard Bertaut	Senior Environmental Manager



February 27, 2008

Signature **Date**

PCB CERTIFICATION

I, Edgard Bertaut/Senior Environmental Manager (generator/title), certify to G.R.O.W.S. Landfill (WM Facility) that within my company, I have knowledge concerning the accuracy of the following representation and that the following representations are correct to the best of my knowledge.

1. Customer has historic PCB contamination, and cannot attribute the contamination to any particular source. (Check applicable box below)

   ☐ X I am unable to locate any information which indicate that a spill of PCBs occurred subsequent to February 17, 1978 which could have contaminated the waste covered by this certification, and the actual PCB concentration of the waste is less than 50 ppm.

   ☐ Any PCBs detected in the waste covered by this certification resulted from a spill of PCBs that occurred prior to February 17, 1978, and the actual PCB concentration of the waste is less than 50 ppm.

2. Spill of PCB material occurred after February 17, 1978 and records or generator knowledge indicate that the contaminant source had concentrations less than 50 ppm. Pertinent sampling data to this certification must be attached. (check applicable box below)

   ☐ The waste covered by this certification has an actual concentration of PCBs less than 50 ppm per generator knowledge or analytical results.

   ☐ The source of the PCB contamination analyzed and found to have a PCB concentration less that 50 ppm.

3. Remediation Waste (40CFR 761.61)

   ☐ The waste covered by this certification is remediation waste, as defined by §761.3, from a cleanup managed under the self-implementing approach, §761.61 (a), with a PCB concentration less than 50 ppm.

   ☐ The waste covered by this certification is cleanup waste regulated under §761.61 (a)(5)(v). The waste may contain PCBs at any concentration and was generated during the cleanup of PCB remediation waste under the self-implementing approach.

      ☐ Generator to attach copy of self-implementing notification submitted under §761.61 (a)(3)(i) and copy of approval of the notification.

      ☐ "I certify that the attached self-implementing notification was submitted to the applicable regulatory authority for approval 30 days prior to the commencement of cleanup activity The regulatory authority did not respond within 30 days of receiving the notification, therefore, it is assumed that the notification is approved."

Total volume of material to be shipped: 9,500 cubic yards Total # of shipments: 146 truck shipments

Highest concentration of PCBs in material: _____

   ☐ The waste is remediation waste from a cleanup conducted under the authority of CERCLA or RCRA.

4. Bulk Product Waste (40CFR 761.62)

   ☐ The waste covered by this certification is PCB bulk waste regulated under §761.62 (b)(1) which include components Containing PCBs at greater than or equal to 50 ppm and leaches at less than 10 micrograms/Liter PCBs.

   ☐ The waste covered by this certification is PCB bulk product waste regulated under §761.62 (b)(2) which include Components containing PCBs at greater than or equal to 50 ppm and leaches at greater than or equal to 10 micrograms/Liter PCBs.

Edgard Bertaut

Signature: _____ Date: February 6, 2008

Rev (4/99)

PCB CERTIFICATION

I, __Edgard Bertaut/Senior Environmental Manager_ (generator/title), certify to__Tullytown Landfill_____ (WM Facility) that within my company, I have knowledge concerning the accuracy of the following representation and that the following representations are correct to the best of my knowledge.

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   ☐ X I am unable to locate any information which indicate that a spill of PCBs occurred subsequent to February 17, 1978 which could have contaminated the waste covered by this certification, and the actual PCB concentration of the waste is less than 50 ppm.

   ☐ Any PCBs detected in the waste covered by this certification resulted from a spill of PCBs that occurred prior to February 17, 1978, and the actual PCB concentration of the waste is less than 50 ppm.

2. Spill of PCB material occurred after February 17, 1978 and records or generator knowledge indicate that the contaminant source had concentrations less than 50 ppm. Pertinent sampling data to this certification must be attached. (check applicable box below)

   ☐ The waste covered by this certification has an actual concentration of PCBs less than 50 ppm per generator knowledge or analytical results.

   ☐ The source of the PCB contamination analyzed and found to have a PCB concentration less that 50 ppm.

3. Remediation Waste (40CFR 761.61)

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Edgard Bertaut

Signature: _____ Date: February 6, 2008

Rev (4/99)

Generator's Nonhazardous Waste Profile Sheet

WASTE MANAGEMENT

Requested Disposal Facility GROWS Landfill & Tullytown RRF Profile Number

☐ Renewal for Profile Number _____ Waste Approval Expiration Date _____

A. Waste Generator Facility Information (must reflect location of waste generation/origin)

1. Generator Name: Li Tungsten Cooperative Group
2. Site Address: 190 Dickson Street
3. City/ZIP: Glen Cove / 11542
4. State: New York
5. County: Nassau
6. Contact Name/Title: Edgard Bertaut/Sr Environmental Mgr
7. Email Address: ebertaut@alleghenytechnologies.com
8. Phone: 301-526-1710 9. FAX: 412-394-3010
10. NAICS Code: NA
11. Generator USEPA ID #: NYD 986882660
12. State ID# (if applicable): _____

B. Customer Information ☑ same as above

P. O. Number: _____

1. Customer Name: _____
2. Billing Address: _____
3. City, State and ZIP: _____
4. Contact Name: _____
5. Contact Email: _____
6. Phone: _____ FAX: _____
7. Transporter Name: _____
8. Transporter ID # (if appl.): _____
9. Transporter Address: _____
10. City, State and ZIP: _____

C. Waste Stream Information

1. DESCRIPTION

a. Common Waste Name: Contaminated Soil and Debris

State Waste Code(s): _____

b. Describe Process Generating Waste or Source of Contamination:

Excavated soils and debris from a site remediation, which have been treated to both the Alternate LDR of 7.5 mg/L and the RCRA characteristic of 5.0 mg/L for lead, thereby rendering them non-hazardous.

c. Typical Color(s): Grayish brown

d. Strong Odor? ☐ Yes ☑ No Describe: _____

e. Physical State at 70°F: ☑ Solid ☐ Liquid ☐ Powder ☐ Semi-Solid or Sludge ☐ Other: _____

f. Layers? ☐ Single layer ☐ Multi- layer ☑ NA

g. Water Reactive? ☐ Yes ☑ No If Yes, Describe: _____

h. Free Liquid Range (%): _____ to _____ ☑ NA(solid)

i. pH Range: ☐ ≤2 ☐ 2.1-12.4 ☐ ≥12.5 ☐ NA(solid) ☑ Actual: 9.82 to 11.45

j. Liquid Flash Point: ☐ < 140°F ☐ ≥ 140°F ☑ NA(solid) ☐ Actual: _____

k. Flammable Solid: ☐ Yes ☑ No

l. Physical Constituents: List all constituents of waste stream - (e.g. Soil 0-80%, Wood 0-20%): ☐ (See Attached)

Constituents *(Total Composition Must be ≥ 100%)*	Concentration %	Constituents *(Total Composition Must be ≥ 100%)*	Concentration %
1. Soil	90-100%	4.	
2. Debris	0-10%	5.	
3.		6.	

2. ESTIMATED QUANTITY OF WASTE AND SHIPPING INFORMATION

a. ☑ Event ☐ Base/Ongoing (Check One)

b. Estimated Annual Quantity: 2,280 ☑ Tons ☐ Cubic Yards ☐ Drums ☐ Gallons ☐ Other (specify): _____

c. Shipping Frequency: _____ Units per ☐ Month ☐ Quarter ☐ Year ☑ One Time ☐ Other

d. Is this a U.S. Department of Transportation (USDOT) Hazardous Material? (If yes, answer e.) ☑ Yes ☐ No

e. USDOT Shipping Description (if applicable): RQ,Environmentally hazardous substances,solid,n.o.s.,9,UN3077, PGIII (lead, arsenic)

3. SAFETY REQUIREMENTS (Handling, PPE, etc.): _____

Generator's Nonhazardous Waste Profile Sheet

D. Regulatory Status (Please check appropriate responses)

1. Is this a USEPA (40 CFR Part 261)/State hazardous waste? If yes, contact your sales representative. ☐ Yes ☑ No
2. Is this waste included in one or more of categories below (Check all that apply)? If yes, attach supporting documentation. ☑ Yes ☐ No
   - ☐ Delisted Hazardous Waste
   - ☐ Excluded Wastes Under 40 CFR 261.4
   - ☐ Treated Hazardous Waste Debris
   - ☑ Treated Characteristic Hazardous Waste
3. Is the waste from a Federal (40 CFR 300, Appendix B) or state mandated clean-up? If yes, see instructions. ☑ Yes ☐ No
4. Does the waste represented by this waste profile sheet contain radioactive material? ☑ Yes ☐ No
   a. If yes, is disposal regulated by the Nuclear Regulatory Commission? ☐ Yes ☑ No
   b. If yes, is disposal regulated by a State Agency for radioactive waste/NORM? ☐ Yes ☑ No
5. Does the waste represented by this waste profile sheet contain concentrations of regulated Polychlorinated Biphenyls (PCBs)? ☑ Yes ☐ No
   a. If yes, is disposal regulated under TSCA? ☐ Yes ☑ No
6. Does the waste contain untreated, regulated, medical or infectious waste? ☐ Yes ☑ No
7. Does the waste contain asbestos? ☐ Yes ☑ No If Yes, ☐ Friable ☐ Non Friable
8. Is this profile for remediation waste from a facility that is a major source of Hazardous Air Pollutants (Site Remediation NESHAP, 40 CFR 63 subpart GGGGG)? ☐ Yes ☑ No
   If yes, does the waste contain <500 ppmw VOHAPs at the point of determination? ☐ Yes ☑ No

E. Generator Certification (Please read and certify by signature below)

By signing this Generator's Waste Profile Sheet, I hereby certify that all:

1. Information submitted in this profile and all attached documents contain true and accurate descriptions of the waste material;
2. Relevant information within the possession of the Generator regarding known or suspected hazards pertaining to this waste has been disclosed to WM/the Contractor;
3. Analytical data attached pertaining to the profiled waste was derived from testing a representative sample in accordance with 40 CFR 261.20(c) or equivalent rules; and
4. Changes that occur in the character of the waste (i.e. changes in the process or new analytical) will be identified by the Generator and disclosed to WM (and the Contractor if applicable) prior to providing the waste to WM (and the Contractor if applicable).
5. Check all that apply:
   - ☑ Attached analytical pertains to the waste. Identify laboratory & sample ID #'s and parameters tested: See Attachment C # Pages: 43
   - ☐ Only the analyses identified on the attachment pertain to the waste (identify by laboratory & sample ID #'s and parameters tested). Attachment #: _____
   - ☑ Additional information necessary to characterize the profiled waste has been attached (other than analytical). Indicate the number of attached pages: Proj Narrative
   - ☐ I am an agent signing on behalf of the Generator, and the delegation of authority to me from the Generator for this signature is available upon request.
   - ☐ By Generator process knowledge, the following waste is not a listed waste and is below all TCLP regulatory limits.

Certification Signature: Edgard Bertaut **Title:** Senior Environmental Manager

Company Name: Li Tungsten Cooperative Group **Name (Print):** Edgard Bertaut

Date: February 27, 2008

FOR WM USE ONLY

Management Method: ☐ Landfill ☐ Bioremediation ☐ Non-hazardous solidification ☐ Other: _____

Approval Decision: ☐ Approved ☐ Not Approved

Waste Approval Expiration Date: _____

Management Facility Precautions, Special Handling Procedures or Limitation on approval: _____

- ☐ Shall not contain free liquid
- ☐ Shipment must be scheduled into disposal facility
- ☐ Approval Number must accompany each shipment
- ☐ Waste Manifest must accompany load

WM Authorization Name / Title: _____ **Date:** _____

State Authorization (if Required): _____ **Date:** _____

WASTE MANAGEMENT

Certificate of Non-Hazardous Waste

I, the undersigned, being duly authorized by my company certify that the wastestream(s) we are disposing at the G.R.O.W.S. Landfill and/or Tullytown Resource Recovery Facility is/are not a characteristic hazardous waste as defined in 40 CFR, Sections 261.20 to 261.24 and/or is not a listed hazardous waste as defined in 40 CFR, Sections 261.30 to 261.34. Furthermore, based on generator's knowledge of the company's process, TCLP and Total Characteristics not tested for are known not to be present in the concentrations equal to or greater than the value specified in the TC Rule 40 CFR Part 261.24.

Signature: Edgard Bertaut Date: February 27, 2008

Printed Name: Edgard Bertaut

Attachment B

Waste Characterization Sampling Plan

February 2008

Waste Characterization Sampling Plan
Dickson Warehouse
Li Tungsten Superfund Site
Glen Cove, New York

Revision 0

December 2007

Jeffrey J. Calarie
Senior Project Manager
URS Corporation

Date: 12-18-07

Prepared By:

URS Corporation
Foster Plaza 4
501 Holiday Drive, Suite 300
Pittsburgh, Pennsylvania 15220

Waste Characterization Sampling Plan
Table of Contents

Waste Characterization Sampling Plan
Dickson Warehouse
Li Tungsten Superfund Site
Glen Cove, New York

1.0 Introduction

On behalf of TDY Holdings, LLC (TDY) and in conformance with the 1999 Record of Decision, Li Tungsten Corporation Superfund Site, Nassau County, New York (1999 ROD), and the Consent Judgment, US v. AGI-VR/Wesson et al. of 2007 (Judgment), URS Corporation (URS) has prepared this Waste Characterization Sampling Plan (WCSP). This WCSP includes a detailed description of the soil sampling activities for implementing the following remedial action scope of work:

- The sampling of approximately 1,500 cubic yards of stabilized, staged soils in the Dickson Warehouse on Parcel C of the Li Tungsten Superfund Site to obtain approval for disposal into a Subtitle D landfill.

2.0 Site Background

The Li Tungsten Superfund Site is located in the City of Glen Cove, Nassau County, New York, and includes the former Li Tungsten Corporation facility at Herbhill Road and Dickson Lane. As a result of processing of ores at the facility on the Li Tungsten property, and the subsequent disposal of portions of the byproducts of that processing, elevated levels of radiation and certain metals had come to be present at or in the vicinity of the Li Tungsten property. The property is approximately 26 acres.

From April 2006 to August 2007, "ECC" activities based on a remedy selected in the 1999 ROD were performed on Parcels B and C of the Li Tungsten Superfund Site that included the excavation and segregation of contaminated soils. After the "ECC" operation, approximately 1,500 cubic yards of RCRA contaminated soils, 30 cubic yards of metals contaminated soils, 555 cubic yards of PCB contaminated soils, and 1,895 cubic yards of radiological contaminated soil remained stockpiled in the Dickson Warehouse located on Parcel C of the Li Tungsten Superfund Site.

From November 17 to November 20, URS performed a treatability study on 500 cubic yards of the RCRA soil stockpile to determine the appropriate amount of additive to fixate the lead contamination. Based on the study, it was determine that 7.5% by weight of Calciment® added to the RCRA stockpile would sufficiently render the soil non-hazardous permitting disposal into a Subtitle D landfill.

From December 3 to December 6, 2007, URS performed a soil stabilization operation on what was determined to be 1,500 cubic yards of lead contaminated soil. The stabilized material was staged into six (6) 250 cubic yard stockpile inside the Dickson Warehouse. See Figure 1.

URS

Figure 1: Stockpile Configuration and Location
Dickson Warehouse

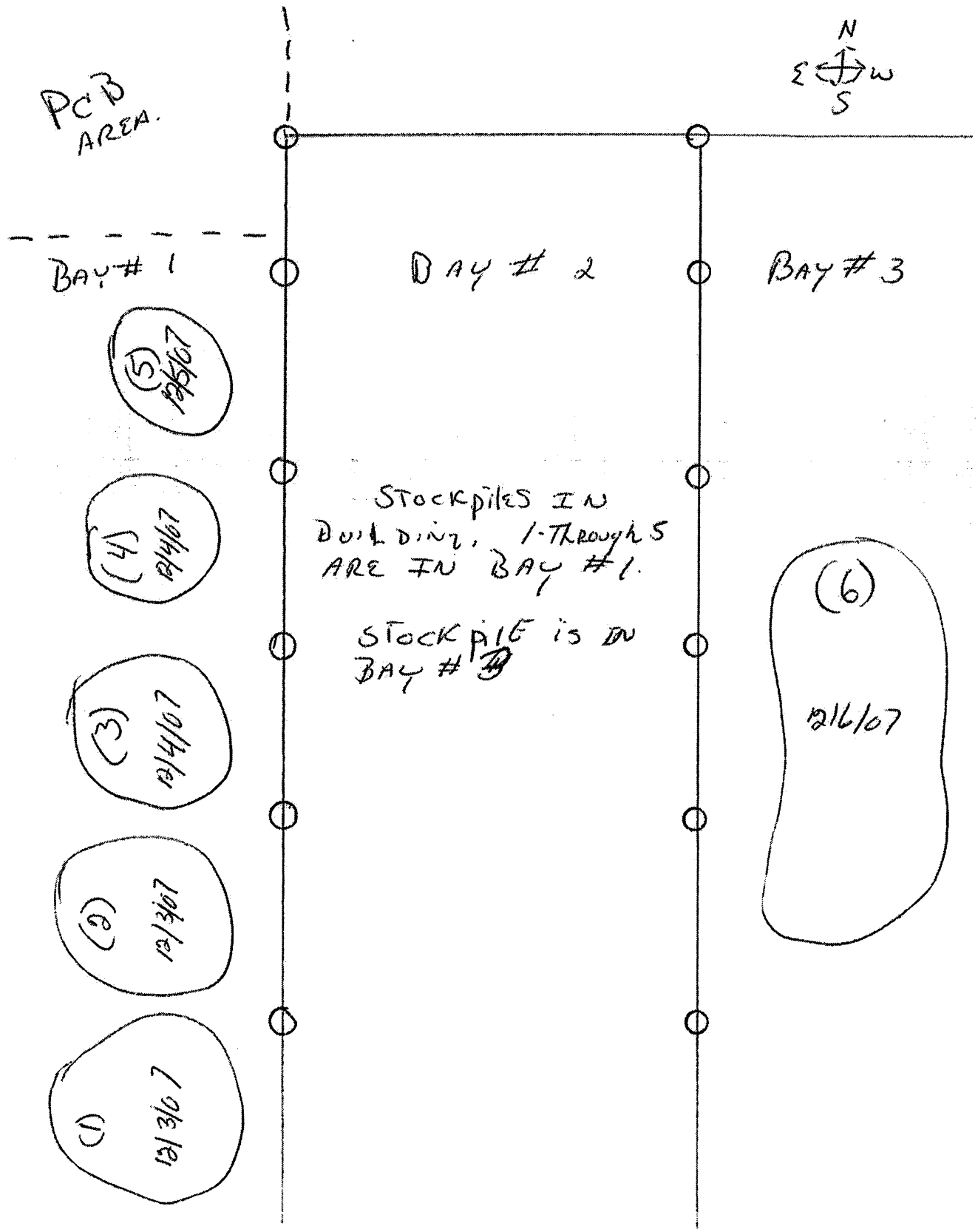
Page ____ of ____

Job LI TUNGSTEN | Project No. ____ | Sheet ____ of ____

Description DICKSON WAREHOUSE | Computed by ____ | Date ____

STOCKPILES IN BUILDING | Checked by ____ | Date ____

Reference



3.0 Waste Characterization Sampling

URS will collect samples for analysis in order to complete the required GROWS Landfill documents for approval of the Li Tungsten soil into the GROWS facility. Per GROWS requirements, URS will collect a sample per 500 cubic yards of material. Based on the 1,500 cubic yards currently stockpiled in the Dickson Warehouse, three (3) samples will be collected for analysis. For the six 250 cubic yard stockpiles, five (5) discrete grab samples will be collected in a triangular grid from the surface of the stockpile. Two (2) 250 cubic yard stockpile discrete sample groups will be combined into one composite sample resulting in a total of two (2) composite samples each representing 500 cubic yards. The three samples will be analyzed for the following parameters.

For volatile organic compounds (VOCs), grab samples will be collected from each of the six stockpiles using EPA Method 5035.

Ignitability
Oil & Grease
Paint Filter Test
PCBs
pH
Reactive Cyanide
Reactive Sulfide
Total Solids
Total Volatile Solids
Ammonia – Nitrogen
Chemical Oxygen Demand
Total Solids
Arsenic
Barium
Cadmium
Chromium
Copper
Lead
Mercury
Nickel
Selenium
Silver
Zinc
2,4-D
2,4,5-TP
Chlordane
Endrin
Heptachlor
Heptachlor Epoxide
Lindane
Methoxychlor
Toxaphene
2,4,5-trichlorophenol
2,4,6-trichlorophenol
m-cresol
o-cresol
p-cresol
Pentachlorophenol
2,4-dinitrotoluene
Hexachlorobenzene
Hexachlorobutadiene
Hexachloroethane
Nitrobenzene
Pyridine
1,1-dichloroethyiene
1,2-dichloroethane
1,4-dichlorobenzene
Benzene
Carbon Tetrachloride
Chlorobenzene
Chloroform
Methyl Ethyl Ketone
Tetrachloroethylene
Trichloroethylene
Vinyl Chloride
Radium-226
Radium-228
Thorium Isotopes

Once analytical results have been received, TDY will complete and submit the Pennsylvania Department of Environmental Protection's Form U document and additional documents required by GROWS for waste acceptance.

Analytical Methods
GROWS Landfill Parameters
Waste Characterization

Suite/Test Name	Test Method
Ammonia (ASTM)	350.1[1]
Chemical Oxygen Demand (ASTM)	410.4[2]
Cyanide (Reactive)	7.3.3.2/9014[2]
Flash Point	1010[2]
Gamma Spectroscopy	PGH-R-023-B
2 Herbicides, TCLP, ECD	8151A[2]
1 Mercury, TCLP, CVAAS	7471[2]
Oil & Grease	9071B[2]
Oil & Grease (ASTM)	1664 ASTM
Paint Filter	9095[2]
8 Polychlorinated Biphenyls, ECD	8082[2]
Percent Solids	% Solids
7 Pesticides, TCLP, ECD	8081[2]
pH	9045[2]
Sulfide (Reactive)	9030[2]
11 Semivolatile Organic Compounds, TCLP, GC/MS	8270C[2]
Total Solids (ASTM)	160.3[2]
Total Solids @105C	160.3
Total Volatile Solids	160.4[1]
7 Trace Metals, TCLP, ICP	6010B[2]
10 Volatile Organic Compounds, TCLP, MS	8260B[2]
Ammonia ASTM Distillation	350.1[1]
BNA TCLP	SV Prep
COD ASTM Prep	410.4[2]
Cyanide Distillation	7.3.3.2/9014[2]
Total Mercury Digestion	7471[2]
Total Metals Digestion	3005
Herbicide Prep, TCLP	8151A[2]
Oil & Grease ASTM Prep	1664 ASTM
Oil & Grease Hexane Extraction	9071B[2]
PCB Prep	8082[2]
Pesticide Prep, TCLP	8081[2]
Total Solids ASTM Prep	160.3[2]
VOA ZHE Prep	ZHE Prep
ASTM Extraction	D3987-85[3]
TCLP Extraction	1311
ZHE TCLP Extraction	1311

Attachment C

Waste Characterization Sample Results

February 2008

Parameter	Units	0712-4708	0712-4709	0712-4710	0712-4711	0712-4712	0712-4713
Volatiles							
Benzene	ug/l	100	<50	<50	<50	<50	<50
2-Butanone	ug/l	<5000	<5000	<5000	<5000	<5000	<5000
Carbon Tetrachloride	ug/l	<50	<50	<50	<50	<50	<50
Chlorobenzene	ug/l	<1000	<1000	<1000	<1000	<1000	<1000
Chloroform	ug/l	<500	<500	<500	<500	<500	<500
1,2-Dichloroethane	ug/l	<50	<50	<50	<50	<50	<50
1,1-Dichloroethene	ug/l	<50	<50	<50	<50	<50	<50
Tetrachloroethene	ug/l	<50	<50	<50	<50	<50	<50
Trichloroethene	ug/l	<50	<50	<50	<50	<50	<50
Vinyl chloride	ug/l	<50	<50	<50	<50	<50	<50
General Chemistry		**0712-4714**	**0712-4715**	**0712-4716**			
Ammonia (ASTM)	mg/l	0.34	0.51	0.35			
Chemical Oxygen Demand (ASTM)	mg/l	31	29	31			
Cyanide (Reactive)	mg/l	<1.1	<1.1	<1.1			
Flash Point	F	>200	>200	>200			
Oil & Grease	mg/kg	560	440	490			
Oil & Grease (ASTM)	mg/l	<5	<5	<5			
Paint Filter	n/a	Pass	Pass	Pass			
pH	pH	11.27	11.45	9.82			
Sufide (Reactive)	mg/kg	<11	<11	<11			
Total Solids (ASTM)	mg/l	300	310	270			
Total Solids @ 105C	%	91	91	91			
Total Volatile Solids	%	<10	<10	<10			
Inorganic Extraction		**0712-4714**	**0712-4715**	**0712-4716**			
Percent Solids	%	90	90	90			
Metals		**0712-4714**	**0712-4715**	**0712-4716**			
Mercury	mg/l	<0.01	<0.01	<0.01			
Aresenic	mg/l	<0.05	<0.05	<0.05			
Barium	mg/l	<1	<1	<1			
Cadmium	mg/l	<0.05	<0.05	<0.05			
Chromium	mg/l	<0.05	<0.05	<0.05			
Lead	mg/l	0.24	0.26	2.2			
Selenium	mg/l	<0.1	<0.1	<0.1			
Silver	mg/l	<0.05	<0.05	<0.05			
PCBs		**0712-4714**	**0712-4715**	**0712-4716**			
Arochlor-1016	mg/kg	<1.8	<1.8	<1.9			
Arochlor-1221	mg/kg	<1.8	<1.8	<1.9			
Arochlor-1232	mg/kg	<1.8	<1.8	<1.9			
Arochlor-1242	mg/kg	<1.8	<1.8	<1.9			
Arochlor-1248	mg/kg	8	10	11			
Arochlor-1254	mg/kg	<1.8	<1.8	<1.9			
Arochlor-1260	mg/kg	<1.8	<1.8	<1.9			
PCB Total-TCL	mg/kg	8	10	11			
Pesticides	**Units**	**0712-4714**	**0712-4715**	**0712-4716**			
gamma-BHC	ug/l	<10	<10	<10			
Technical Chlorodane	ug/l	<10	<10	<10			
Endrin	ug/l	<1	<1	<1			

Heptachlor	ug/l	<0.5	<0.5	<0.5			
Heptachlor Epoxide	ug/l	<0.5	<0.5	<0.5			
Methoxychlor	ug/l	<100	<100	<100			
Toxaphene	ug/l	<50	<50	<50			
Semivolatiles		**0712-4714**	**0712-4715**	**0712-4716**			
Cresol (Total)	ug/l	<5000	<5000	<5000			
1,4-Dichlorobenzene	ug/l	<500	<500	<500			
2,4-Dinitrotoluene	ug/l	<100	<100	<100			
Hexachlorobenzene	ug/l	<100	<100	<100			
Hexachlorobutadiene	ug/l	<100	<100	<100			
Hexachloroethane	ug/l	<500	<500	<500			
Nitrobenzene	ug/l	<100	<100	<100			
Pentachlorophenol	ug/l	<5000	<5000	<5000			
Pyridine	ug/l	<500	<500	<500			
2,4,5-Trichlorophenol	ug/l	<5000	<5000	<5000			
2,4,6-Trichlorophenol	ug/l	<100	<100	<100			
Herbicides		**0712-4714**	**0712-4715**	**0712-4716**			
2,4-D	ug/l	ND	0.0784	ND			
2,4,5-TP	ug/l	ND	ND	ND			
Volatiles		**0712-4714**	**0712-4715**	**0712-4716**			
Benzene	ug/l	<50	120	<50			
2-Butanone	ug/l	<5000	<5000	<5000			
Carbon Tetrachloride	ug/l	<50	<50	<50			
Chlorobenzene	ug/l	<1000	<1000	<1000			
Chloroform	ug/l	<500	<500	<500			
1,2-Dichloroethane	ug/l	<50	<50	<50			
1,1-Dichloroethene	ug/l	<50	<50	<50			
Tetrachloroethene	ug/l	<50	<50	<50			
Trichloroethene	ug/l	<50	<50	<50			
Vinyl chloride	ug/l	<50	<50	<50			
Gamma Spectrometry		**0712-4714**	**0712-4715**	**0712-4716**			
Bi-214	pCi/g (MDC)	0.769 ± 0.099 (0.020)	0.934 ± 0.127 (0.042)	0.894 ± 0.107 (0.020)			
Pb-214	pCi/g (MDC)	0.789 ± 0.086 (0.017)	1.07 ± 0.145 (0.033)	0.992 ± 0.110 (0.021)			
Ra-226	pCi/g (MDC)	2.62 ± 0.714 (0.230)	3.29 ± 1.53 (0.729)	3.92 ± 1.06 (0.309)			
Ac-228	pCi/g (MDC)	0.786 ± 0.131 (0.040)	0.980 ± 0.193 (0.066)	1.04 ± 0.152 (0.042)			
Th-228	pCi/g (MDC)	0.786 ± 0.131 (0.040)	0.980 ± 0.193 (0.066)	1.04 ± 0.152 (0.042)			
Th-230	pCi/g (MDC)	2.33 ± 0.621 (0.192)	2.07 ± 1.75 (0.898)	1.45 ± 0.642 (0.303)			
Th-232	pCi/g (MDC)	0.786 ± 0.131 (0.040)	0.980 ± 0.193 (0.066)	1.04 ± 0.152 (0.042)			
U-234	pCi/g (MDC)	2.33 ± 0.621 (0.192)	2.07 ± 1.75 (0.898)	1.45 ± 0.642 (0.303)			
U-235	pCi/g (MDC)	0.103 ± 0.032 (0.084)	0.179 ± 0.085 (0.231)	0.174 ± 0.044 (0.096)			
U-238	pCi/g (MDC)	2.33 ± 0.621 (0.192)	2.07 ± 1.75 (0.898)	1.45 ± 0.642 (0.303)			

Pace Analytical®
www.pacelabs.com

Pace Analytical Services, Inc.
5203 Triangle Lane
Export, PA 15632
Phone: 724.733.1161
Fax: 724.327.7793

January 16, 2008

Mr. Jeff Calarie
URS Corporation
Construction Services Division
Foster Plaza 4
501 Holiday Drive, Suite 300
Pittsburgh, PA 15220

Dear Mr. Calarie:

Enclosed are analytical results for samples submitted to Pace Analytical by URS Corporation. The samples were received on December 24, 2007. The results reported in this project meet the requirements as specified in Chapter 5 of the NELAC Standards. Any deviations or discrepancies from the NELAC standards are documented in the case narrative(s) of this report. Parameters printed in italics represent Non-NELAC accredited parameters. Please reference Pace project number 07-9918 when inquiring about this report.

Client Site: LI Tungsten
Client Ref.: 41785922.00001

Pace Sample Identification	Client Sample Identification
0712-4708	Pile 1
0712-4709	Pile 2
0712-4710	Pile 3
0712-4711	Pile 4
0712-4712	Pile 5

Pace Sample Identification	Client Sample Identification
0712-4713	Pile 6
0712-4714	Pile 1&2
0712-4715	Pile 3&4&5
0712-4716	Pile 6C

General Comments: Cooler temperature 5 ° C upon receipt. Ice was present. The samples were subcontracted to Pace Analytical Services, Inc., 1000 Riverbend Blvd., Suite F, St. Rose, LA 70087 for TCLP Herbicide analysis. Results of the analysis are reported on the Pace Analytical, New Orleans data tables. The samples were subcontracted to Pace Analytical Services, Inc., P.O. Box 158 Building G, Madison, PA 15663-0158 for Gamma Spectroscopy analysis. Results of the analysis are reported on the Pace Analytical, Waltz Mill data tables.

REPORT OF LABORATORY ANALYSIS

Pace Analytical®
www.pacelabs.com

Pace Analytical Services, Inc.
5203 Triangle Lane
Export, PA 15632
Phone: 724.733.1161
Fax: 724.327.7793

Please call me if you have any questions regarding the information contained within this report.

Sincerely,

Raelyn E. Sylvester
Project Manager

REC: jld

Enclosures

Page 1 of 40

REPORT OF LABORATORY ANALYSIS

Pace Analytical®
www.pacelabs.com

Pace Analytical Services, Inc.
5203 Triangle Lane
Export, PA 15632
Phone: 724.733.1161
Fax: 724.327.7793

Mr. Jeff Calarie
URS Corporation
Construction Services Division
Foster Plaza 4
501 Holiday Drive, Suite 300
Pittsburgh, PA 15220

Client Site: LI Tungsten
Client Ref.: 41785922.00001

Lab Project ID: **07-9918**
Lab Sample ID: **0712-4708**
Client Sample ID: Pile 1
Sample Matrix: Solid

Date Sampled: 12/21/2007
Date Received: 12/24/2007

Volatiles

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Volatile Organic Compounds, TCLP, MS								
Benzene	8260B(1)	100	50	ug/l	JHC	01/09/2008	0069453-1	<50
2-Butanone	8260B(1)	<5000	5000	ug/l	EAC	01/07/2008	0069382-1	<5000
Carbon Tetrachloride	8260B(1)	<50	50	ug/l	EAC	01/07/2008	0069382-1	<50
Chlorobenzene	8260B(1)	<1000	1000	ug/l	EAC	01/07/2008	0069382-1	<1000
Chloroform	8260B(1)	<500	500	ug/l	EAC	01/07/2008	0069382-1	<500
1,2-Dichloroethane	8260B(1)	<50	50	ug/l	EAC	01/07/2008	0069382-1	<50
1,1-Dichloroethene	8260B(1)	<50	50	ug/l	EAC	01/07/2008	0069382-1	<50
Tetrachloroethene	8260B(1)	<50	50	ug/l	EAC	01/07/2008	0069382-1	<50
Trichloroethene	8260B(1)	<50	50	ug/l	EAC	01/07/2008	0069382-1	<50
Vinyl chloride	8260B(1)	<50	50	ug/l	EAC	01/07/2008	0069382-1	<50

(1) U.S. Environmental Protection Agency, 1996, Test Methods for Evaluating Solid Waste, SW-846, 3rd ed., Office of Solid Waste and Emergency Response, Washington, DC.

Sample Comments: Results reported on an as received basis.

REPORT OF LABORATORY ANALYSIS

Pace Analytical®
www.pacelabs.com

Pace Analytical Services, Inc.
5203 Triangle Lane
Export, PA 15632
Phone: 724.733.1161
Fax: 724.327.7793

Mr. Jeff Calarie
URS Corporation
Construction Services Division
Foster Plaza 4
501 Holiday Drive, Suite 300
Pittsburgh, PA 15220

Client Site: LI Tungsten
Client Ref.: 41785922.00001

Lab Project ID: **07-9918**
Lab Sample ID: **0712-4709**
Client Sample ID: Pile 2
Sample Matrix: Solid

Date Sampled: 12/21/2007
Date Received: 12/24/2007

Volatiles

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Volatile Organic Compounds, TCLP, MS								
Benzene	8260B(1)	<50	50	ug/l	EAC	01/07/2008	0069382-1	<50
2-Butanone	8260B(1)	<5000	5000	ug/l	EAC	01/07/2008	0069382-1	<5000
Carbon Tetrachloride	8260B(1)	<50	50	ug/l	EAC	01/07/2008	0069382-1	<50
Chlorobenzene	8260B(1)	<1000	1000	ug/l	EAC	01/07/2008	0069382-1	<1000
Chloroform	8260B(1)	<500	500	ug/l	EAC	01/07/2008	0069382-1	<500
1,2-Dichloroethane	8260B(1)	<50	50	ug/l	EAC	01/07/2008	0069382-1	<50
1,1-Dichloroethene	8260B(1)	<50	50	ug/l	EAC	01/07/2008	0069382-1	<50
Tetrachloroethene	8260B(1)	<50	50	ug/l	EAC	01/07/2008	0069382-1	<50
Trichloroethene	8260B(1)	<50	50	ug/l	EAC	01/07/2008	0069382-1	<50
Vinyl chloride	8260B(1)	<50	50	ug/l	EAC	01/07/2008	0069382-1	<50

(1) U.S. Environmental Protection Agency, 1996, Test Methods for Evaluating Solid Waste, SW-846, 3rd ed., Office of Solid Waste and Emergency Response, Washington, DC.

Sample Comments: Results reported on an as received basis.

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Construction Services Division
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501 Holiday Drive, Suite 300
Pittsburgh, PA 15220

Client Site: LI Tungsten
Client Ref.: 41785922.00001

Lab Project ID: **07-9918**
Lab Sample ID: **0712-4710**
Client Sample ID: Pile 3
Sample Matrix: Solid

Date Sampled: 12/21/2007
Date Received: 12/24/2007

Volatiles

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Volatile Organic Compounds, TCLP, MS								
Benzene	8260B(1)	<50	50	ug/l	EAC	01/07/2008	0069382-1	<50
2-Butanone	8260B(1)	<5000	5000	ug/l	EAC	01/07/2008	0069382-1	<5000
Carbon Tetrachloride	8260B(1)	<50	50	ug/l	EAC	01/07/2008	0069382-1	<50
Chlorobenzene	8260B(1)	<1000	1000	ug/l	EAC	01/07/2008	0069382-1	<1000
Chloroform	8260B(1)	<500	500	ug/l	EAC	01/07/2008	0069382-1	<500
1,2-Dichloroethane	8260B(1)	<50	50	ug/l	EAC	01/07/2008	0069382-1	<50
1,1-Dichloroethene	8260B(1)	<50	50	ug/l	EAC	01/07/2008	0069382-1	<50
Tetrachloroethene	8260B(1)	<50	50	ug/l	EAC	01/07/2008	0069382-1	<50
Trichloroethene	8260B(1)	<50	50	ug/l	EAC	01/07/2008	0069382-1	<50
Vinyl chloride	8260B(1)	<50	50	ug/l	EAC	01/07/2008	0069382-1	<50

(1) U.S. Environmental Protection Agency, 1996, Test Methods for Evaluating Solid Waste, SW-846, 3rd ed., Office of Solid Waste and Emergency Response, Washington, DC.

Sample Comments: Results reported on an as received basis.

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Client Site: LI Tungsten
Client Ref.: 41785922.00001

Lab Project ID: **07-9918**
Lab Sample ID: **0712-4711**
Client Sample ID: Pile 4
Sample Matrix: Solid

Date Sampled: 12/21/2007
Date Received: 12/24/2007

Volatiles

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Volatile Organic Compounds, TCLP, MS								
Benzene	8260B(1)	<50	50	ug/l	EAC	01/07/2008	0069382-1	<50
2-Butanone	8260B(1)	<5000	5000	ug/l	EAC	01/07/2008	0069382-1	<5000
Carbon Tetrachloride	8260B(1)	<50	50	ug/l	EAC	01/07/2008	0069382-1	<50
Chlorobenzene	8260B(1)	<1000	1000	ug/l	EAC	01/07/2008	0069382-1	<1000
Chloroform	8260B(1)	<500	500	ug/l	EAC	01/07/2008	0069382-1	<500
1,2-Dichloroethane	8260B(1)	<50	50	ug/l	EAC	01/07/2008	0069382-1	<50
1,1-Dichloroethene	8260B(1)	<50	50	ug/l	EAC	01/07/2008	0069382-1	<50
Tetrachloroethene	8260B(1)	<50	50	ug/l	EAC	01/07/2008	0069382-1	<50
Trichloroethene	8260B(1)	<50	50	ug/l	EAC	01/07/2008	0069382-1	<50
Vinyl chloride	8260B(1)	<50	50	ug/l	EAC	01/07/2008	0069382-1	<50

(1) U.S. Environmental Protection Agency, 1996, Test Methods for Evaluating Solid Waste, SW-846, 3rd ed., Office of Solid Waste and Emergency Response, Washington, DC.

Sample Comments: Results reported on an as received basis.

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Client Site: LI Tungsten
Client Ref.: 41785922.00001

Lab Project ID: 07-9918
Lab Sample ID: 0712-4712
Client Sample ID: Pile 5
Sample Matrix: Solid

Date Sampled: 12/21/2007
Date Received: 12/24/2007

Volatiles

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Volatile Organic Compounds, TCLP, MS								
Benzene	8260B(1)	<50	50	ug/l	EAC	01/07/2008	0069382-1	<50
2-Butanone	8260B(1)	<5000	5000	ug/l	EAC	01/07/2008	0069382-1	<5000
Carbon Tetrachloride	8260B(1)	<50	50	ug/l	EAC	01/07/2008	0069382-1	<50
Chlorobenzene	8260B(1)	<1000	1000	ug/l	EAC	01/07/2008	0069382-1	<1000
Chloroform	8260B(1)	<500	500	ug/l	EAC	01/07/2008	0069382-1	<500
1,2-Dichloroethane	8260B(1)	<50	50	ug/l	EAC	01/07/2008	0069382-1	<50
1,1-Dichloroethene	8260B(1)	<50	50	ug/l	EAC	01/07/2008	0069382-1	<50
Tetrachloroethene	8260B(1)	<50	50	ug/l	EAC	01/07/2008	0069382-1	<50
Trichloroethene	8260B(1)	<50	50	ug/l	EAC	01/07/2008	0069382-1	<50
Vinyl chloride	8260B(1)	<50	50	ug/l	EAC	01/07/2008	0069382-1	<50

(1) U.S. Environmental Protection Agency, 1996, Test Methods for Evaluating Solid Waste, SW-846, 3rd ed., Office of Solid Waste and Emergency Response, Washington, DC.

Sample Comments: Results reported on an as received basis.

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Client Site: LI Tungsten
Client Ref.: 41785922.00001

Lab Project ID: 07-9918
Lab Sample ID: 0712-4713
Client Sample ID: Pile 6
Sample Matrix: Solid

Date Sampled: 12/21/2007
Date Received: 12/24/2007

Volatiles

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Volatile Organic Compounds, TCLP, MS								
Benzene	8260B(1)	<50	50	ug/l	EAC	01/07/2008	0069382-1	<50
2-Butanone	8260B(1)	<5000	5000	ug/l	EAC	01/07/2008	0069382-1	<5000
Carbon Tetrachloride	8260B(1)	<50	50	ug/l	EAC	01/07/2008	0069382-1	<50
Chlorobenzene	8260B(1)	<1000	1000	ug/l	EAC	01/07/2008	0069382-1	<1000
Chloroform	8260B(1)	<500	500	ug/l	EAC	01/07/2008	0069382-1	<500
1,2-Dichloroethane	8260B(1)	<50	50	ug/l	EAC	01/07/2008	0069382-1	<50
1,1-Dichloroethene	8260B(1)	<50	50	ug/l	EAC	01/07/2008	0069382-1	<50
Tetrachloroethene	8260B(1)	<50	50	ug/l	EAC	01/07/2008	0069382-1	<50
Trichloroethene	8260B(1)	<50	50	ug/l	EAC	01/07/2008	0069382-1	<50
Vinyl chloride	8260B(1)	<50	50	ug/l	EAC	01/07/2008	0069382-1	<50

(1) U.S. Environmental Protection Agency, 1996, Test Methods for Evaluating Solid Waste, SW-846, 3rd ed., Office of Solid Waste and Emergency Response, Washington, DC.

Sample Comments: Results reported on an as received basis.

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Client Site: LI Tungsten
Client Ref.: 41785922.00001

Lab Project ID: 07-9918
Lab Sample ID: 0712-4714
Client Sample ID: Pile 1&2
Sample Matrix: Solid

Date Sampled: 12/21/2007
Date Received: 12/24/2007

General Chemistry

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Ammonia (ASTM)	350.1(1)	0.34	0.10	mg/l	BRJ	01/08/2008	0069408-1	<0.10
Chemical Oxygen Demand (ASTM)	410.4(2)	31	25	mg/l	BKH	01/09/2008	0069459-1	<25
Cyanide (Reactive)	7.3.3.2/9014(2)	<1.1	1.1	mg/kg	SAB	01/04/2008	0069396-1	<1.0
Flash Point	1010(2)	>200	60	F	SAB	01/07/2008	N/A	N/A
Oil & Grease	9071B(2)	560	56	mg/kg	DLH	01/02/2008	0069336-1	<50
Oil & Grease (ASTM)	1664 ASTM	<5.0	5.0	mg/l	DLH	01/03/2008	0069300-1	<5.0
Paint Filter	9095(2)	PASS	N/A	n/a	DJ0	01/04/2008	N/A	N/A
pH	9045(2)	11.27	2.00	pH	DJT	01/07/2008	0069391-1	4.66
Sulfide (Reactive)	9030(2)	<11	11	mg/kg	SAB	01/04/2008	0069377-1	<10
Total Solids (ASTM)	160.3(2)	300	10	mg/l	DLH	01/08/2008	0069423-1	<10
Total Solids @105C	160.3	91	10	%	DLH	12/31/2007	0069351-1	<10
Total Volatile Solids	160.4(1)	<10	10	%	DLH	12/31/2007	0069352-1	<10

Inorganic Extraction

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Percent Solids	% Solids	90	N/A	%	DAB	12/26/2007	N/A	N/A

Metals

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Mercury, TCLP, CVAAS								
Mercury	7471(2)	<0.010	0.010	mg/l	CS0	01/03/2008	0069230-1	<0.010
Trace Metals, TCLP, ICP								
Arsenic	6010B(2)	<0.050	0.050	mg/l	PMM	12/31/2007	0069133-1	<0.050
Barium	6010B(2)	<1.0	1.0	mg/l	PMM	12/31/2007	0069133-1	<1.0
Cadmium	6010B(2)	<0.050	0.050	mg/l	PMM	12/31/2007	0069133-1	<0.050
Chromium	6010B(2)	<0.050	0.050	mg/l	PMM	12/31/2007	0069133-1	<0.050
Lead	6010B(2)	0.24	0.050	mg/l	PMM	12/31/2007	0069133-1	<0.050
Selenium	6010B(2)	<0.10	0.10	mg/l	PMM	12/31/2007	0069133-1	<0.10
Silver	6010B(2)	<0.050	0.050	mg/l	PMM	12/31/2007	0069133-1	<0.050

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Lab Sample ID: 0712-4714
Client Sample ID: Pile 1&2

Pesticides/PCB
Pesticides/PCB

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Polychlorinated Biphenyls, ECD								
Aroclor-1016	8082(2)	<1.8	1.8	mg/kg	RDJ	01/03/2008	0069169-1	<1.0
Aroclor-1221	8082(2)	<1.8	1.8	mg/kg	RDJ	01/03/2008	0069169-1	<1.0
Aroclor-1232	8082(2)	<1.8	1.8	mg/kg	RDJ	01/03/2008	0069169-1	<1.0
Aroclor-1242	8082(2)	<1.8	1.8	mg/kg	RDJ	01/03/2008	0069169-1	<1.0
Aroclor-1248	8082(2)	8.0	1.8	mg/kg	RDJ	01/03/2008	0069169-1	<1.0
Aroclor-1254	8082(2)	<1.8	1.8	mg/kg	RDJ	01/03/2008	0069169-1	<1.0
Aroclor-1260	8082(2)	<1.8	1.8	mg/kg	RDJ	01/03/2008	0069169-1	<1.0
PCB Total-TCL	8082(2)	8.0	1.8	mg/kg	RDJ	01/03/2008	0069169-1	<1.0
Pesticides, TCLP, ECD								
gamma-BHC	8081(2)	<10	10	ug/l	SJG	01/05/2008	0069126-1	<10
Technical Chlordane	8081(2)	<10	10	ug/l	SJG	01/05/2008	0069126-1	<10
Endrin	8081(2)	<1.0	1.0	ug/l	SJG	01/05/2008	0069126-1	<1.0
Heptachlor	8081(2)	<0.50	0.50	ug/l	SJG	01/05/2008	0069126-1	<0.50
Heptachlor Epoxide	8081(2)	<0.50	0.50	ug/l	SJG	01/05/2008	0069126-1	<0.50
Methoxychlor	8081(2)	<100	100	ug/l	SJG	01/05/2008	0069126-1	<100
Toxaphene	8081(2)	<50	50	ug/l	SJG	01/05/2008	0069126-1	<50

Semivolatiles

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Semivolatile Organic Compounds, TCLP, GC/MS								
Cresol (Total)	8270C(2)	<5000	5000	ug/l	SPL	01/09/2008	0069227-1	<5000
1,4-Dichlorobenzene	8270C(2)	<500	500	ug/l	SPL	01/09/2008	0069227-1	<500
2,4-Dinitrotoluene	8270C(2)	<100	100	ug/l	SPL	01/09/2008	0069227-1	<100
Hexachlorobenzene	8270C(2)	<100	100	ug/l	SPL	01/09/2008	0069227-1	<100
Hexachlorobutadiene	8270C(2)	<100	100	ug/l	SPL	01/09/2008	0069227-1	<100
Hexachloroethane	8270C(2)	<500	500	ug/l	SPL	01/09/2008	0069227-1	<500
Nitrobenzene	8270C(2)	<100	100	ug/l	SPL	01/09/2008	0069227-1	<100
Pentachlorophenol	8270C(2)	<5000	5000	ug/l	SPL	01/09/2008	0069227-1	<5000
Pyridine	8270C(2)	<500	500	ug/l	SPL	01/09/2008	0069227-1	<500
2,4,5-Trichlorophenol	8270C(2)	<5000	5000	ug/l	SPL	01/09/2008	0069227-1	<5000
2,4,6-Trichlorophenol	8270C(2)	<100	100	ug/l	SPL	01/09/2008	0069227-1	<100

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Lab Sample ID: 0712-4714
Client Sample ID: Pile 1&2

Subcontracted Work

Subcontracted Work

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Gamma Spectroscopy	PGH-R-023-B	Completed	N/A	n/a			N/A	N/A
Herbicides, TCLP, ECD								
2,4-D	8151A(2)	Completed	100	ug/l			N/A	N/A
2,4,5-TP	8151A(2)	Completed	10	ug/l			N/A	N/A

Volatiles

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Volatile Organic Compounds, TCLP, MS								
Benzene	8260B(2)	<50	50	ug/l	EAC	01/07/2008	0069382-1	<50
2-Butanone	8260B(2)	<5000	5000	ug/l	EAC	01/07/2008	0069382-1	<5000
Carbon Tetrachloride	8260B(2)	<50	50	ug/l	EAC	01/07/2008	0069382-1	<50
Chlorobenzene	8260B(2)	<1000	1000	ug/l	EAC	01/07/2008	0069382-1	<1000
Chloroform	8260B(2)	<500	500	ug/l	EAC	01/07/2008	0069382-1	<500
1,2-Dichloroethane	8260B(2)	<50	50	ug/l	EAC	01/07/2008	0069382-1	<50
1,1-Dichloroethene	8260B(2)	<50	50	ug/l	EAC	01/07/2008	0069382-1	<50
Tetrachloroethene	8260B(2)	<50	50	ug/l	EAC	01/07/2008	0069382-1	<50
Trichloroethene	8260B(2)	<50	50	ug/l	EAC	01/07/2008	0069382-1	<50
Vinyl chloride	8260B(2)	<50	50	ug/l	EAC	01/07/2008	0069382-1	<50

(1) U.S. Environmental Protection Agency, 1983, Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020, Environmental Monitoring and Support Laboratory, Cincinnati, Ohio.
(2) U.S. Environmental Protection Agency, 1983, Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020, Environmental Monitoring and Support Laboratory, Cincinnati, Ohio. Results only report those compounds that are soluble in the ASTM extraction.

Sample Comments: Results reported in dry weight equivalence.

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Pittsburgh, PA 15220

Client Site: LI Tungsten
Client Ref.: 41785922.00001

Lab Project ID: 07-9918
Lab Sample ID: 0712-4715
Client Sample ID: Pile 3&4&5
Sample Matrix: Solid

Date Sampled: 12/21/2007
Date Received: 12/24/2007

General Chemistry

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Ammonia (ASTM)	350.1(1)	0.51	0.10	mg/l	BRJ	01/08/2008	0069408-1	<0.10
Chemical Oxygen Demand (ASTM)	410.4(2)	29	25	mg/l	BKH	01/09/2008	0069459-1	<25
Cyanide (Reactive)	7.3.3.2/9014(2)	<1.1	1.1	mg/kg	SAB	01/04/2008	0069396-1	<1.0
Flash Point	1010(2)	>200	60	F	SAB	01/07/2008	N/A	N/A
Oil & Grease	9071B(2)	440	56	mg/kg	DLH	01/02/2008	0069336-1	<50
Oil & Grease (ASTM)	1664 ASTM	<5.0	5.0	mg/l	DLH	01/03/2008	0069300-1	<5.0
Paint Filter	9095(2)	PASS	N/A	n/a	DJ0	01/04/2008	N/A	N/A
pH	9045(2)	11.45	2.00	pH	DJT	01/07/2008	0069391-1	4.66
Sulfide (Reactive)	9030(2)	<11	11	mg/kg	SAB	01/04/2008	0069377-1	<10
Total Solids (ASTM)	160.3(2)	310	10	mg/l	DLH	01/08/2008	0069423-1	<10
Total Solids @105C	160.3	91	10	%	DLH	12/31/2007	0069351-1	<10
Total Volatile Solids	160.4(1)	<10	10	%	DLH	12/31/2007	0069352-1	<10

Inorganic Extraction

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Percent Solids	% Solids	90	N/A	%	DAB	12/26/2007	N/A	N/A

Metals

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Mercury, TCLP, CVAAS								
Mercury	7471(2)	<0.010	0.010	mg/l	CS0	01/03/2008	0069230-1	<0.010
Trace Metals, TCLP, ICP								
Arsenic	6010B(2)	<0.050	0.050	mg/l	PMM	12/31/2007	0069133-1	<0.050
Barium	6010B(2)	<1.0	1.0	mg/l	PMM	12/31/2007	0069133-1	<1.0
Cadmium	6010B(2)	<0.050	0.050	mg/l	PMM	12/31/2007	0069133-1	<0.050
Chromium	6010B(2)	<0.050	0.050	mg/l	PMM	12/31/2007	0069133-1	<0.050
Lead	6010B(2)	0.26	0.050	mg/l	PMM	12/31/2007	0069133-1	<0.050
Selenium	6010B(2)	<0.10	0.10	mg/l	PMM	12/31/2007	0069133-1	<0.10
Silver	6010B(2)	<0.050	0.050	mg/l	PMM	12/31/2007	0069133-1	<0.050

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Lab Sample ID: 0712-4715
Client Sample ID: Pile 3&4&5

Pesticides/PCB
Pesticides/PCB

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Polychlorinated Biphenyls, ECD								
Aroclor-1016	8082(2)	<1.8	1.8	mg/kg	RDJ	01/03/2008	0069169-1	<1.0
Aroclor-1221	8082(2)	<1.8	1.8	mg/kg	RDJ	01/03/2008	0069169-1	<1.0
Aroclor-1232	8082(2)	<1.8	1.8	mg/kg	RDJ	01/03/2008	0069169-1	<1.0
Aroclor-1242	8082(2)	<1.8	1.8	mg/kg	RDJ	01/03/2008	0069169-1	<1.0
Aroclor-1248	8082(2)	10	1.8	mg/kg	RDJ	01/03/2008	0069169-1	<1.0
Aroclor-1254	8082(2)	<1.8	1.8	mg/kg	RDJ	01/03/2008	0069169-1	<1.0
Aroclor-1260	8082(2)	<1.8	1.8	mg/kg	RDJ	01/03/2008	0069169-1	<1.0
PCB Total-TCL	8082(2)	10	1.8	mg/kg	RDJ	01/03/2008	0069169-1	<1.0
Pesticides, TCLP, ECD								
gamma-BHC	8081(2)	<10	10	ug/l	SJG	01/05/2008	0069126-1	<10
Technical Chlordane	8081(2)	<10	10	ug/l	SJG	01/05/2008	0069126-1	<10
Endrin	8081(2)	<1.0	1.0	ug/l	SJG	01/05/2008	0069126-1	<1.0
Heptachlor	8081(2)	<0.50	0.50	ug/l	SJG	01/05/2008	0069126-1	<0.50
Heptachlor Epoxide	8081(2)	<0.50	0.50	ug/l	SJG	01/05/2008	0069126-1	<0.50
Methoxychlor	8081(2)	<100	100	ug/l	SJG	01/05/2008	0069126-1	<100
Toxaphene	8081(2)	<50	50	ug/l	SJG	01/05/2008	0069126-1	<50

Semivolatiles

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Semivolatile Organic Compounds, TCLP, GC/MS								
Cresol (Total)	8270C(2)	<5000	5000	ug/l	SPL	01/09/2008	0069227-1	<5000
1,4-Dichlorobenzene	8270C(2)	<500	500	ug/l	SPL	01/09/2008	0069227-1	<500
2,4-Dinitrotoluene	8270C(2)	<100	100	ug/l	SPL	01/09/2008	0069227-1	<100
Hexachlorobenzene	8270C(2)	<100	100	ug/l	SPL	01/09/2008	0069227-1	<100
Hexachlorobutadiene	8270C(2)	<100	100	ug/l	SPL	01/09/2008	0069227-1	<100
Hexachloroethane	8270C(2)	<500	500	ug/l	SPL	01/09/2008	0069227-1	<500
Nitrobenzene	8270C(2)	<100	100	ug/l	SPL	01/09/2008	0069227-1	<100
Pentachlorophenol	8270C(2)	<5000	5000	ug/l	SPL	01/09/2008	0069227-1	<5000
Pyridine	8270C(2)	<500	500	ug/l	SPL	01/09/2008	0069227-1	<500
2,4,5-Trichlorophenol	8270C(2)	<5000	5000	ug/l	SPL	01/09/2008	0069227-1	<5000
2,4,6-Trichlorophenol	8270C(2)	<100	100	ug/l	SPL	01/09/2008	0069227-1	<100

REPORT OF LABORATORY ANALYSIS

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Fax: 724.327.7793

Lab Sample ID: 0712-4715
Client Sample ID: Pile 3&4&5

Subcontracted Work
Subcontracted Work

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Gamma Spectroscopy	PGH-R-023-B	Completed	N/A	n/a			N/A	N/A
Herbicides, TCLP, ECD								
2,4-D	8151A(2)	Completed	100	ug/l			N/A	N/A
2,4,5-TP	8151A(2)	Completed	10	ug/l			N/A	N/A

Volatiles

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Volatile Organic Compounds, TCLP, MS								
Benzene	8260B(2)	120	50	ug/l	EAC	01/07/2008	0069382-1	<50
2-Butanone	8260B(2)	<5000	5000	ug/l	EAC	01/07/2008	0069382-1	<5000
Carbon Tetrachloride	8260B(2)	<50	50	ug/l	EAC	01/07/2008	0069382-1	<50
Chlorobenzene	8260B(2)	<1000	1000	ug/l	EAC	01/07/2008	0069382-1	<1000
Chloroform	8260B(2)	<500	500	ug/l	EAC	01/07/2008	0069382-1	<500
1,2-Dichloroethane	8260B(2)	<50	50	ug/l	EAC	01/07/2008	0069382-1	<50
1,1-Dichloroethene	8260B(2)	<50	50	ug/l	EAC	01/07/2008	0069382-1	<50
Tetrachloroethene	8260B(2)	<50	50	ug/l	EAC	01/07/2008	0069382-1	<50
Trichloroethene	8260B(2)	<50	50	ug/l	EAC	01/07/2008	0069382-1	<50
Vinyl chloride	8260B(2)	<50	50	ug/l	EAC	01/07/2008	0069382-1	<50

(1) U.S. Environmental Protection Agency, 1983, Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020, Environmental Monitoring and Support Laboratory, Cincinnati, Ohio.
(2) U.S. Environmental Protection Agency, 1983, Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020, Environmental Monitoring and Support Laboratory, Cincinnati, Ohio. Results only report those compounds that are soluble in the ASTM extraction.

Sample Comments: Results reported in dry weight equivalence.

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Mr. Jeff Calarie
URS Corporation
Construction Services Division
Foster Plaza 4
501 Holiday Drive, Suite 300
Pittsburgh, PA 15220

Client Site: LI Tungsten
Client Ref.: 41785922.00001

Lab Project ID: **07-9918**
Lab Sample ID: **0712-4716**
Client Sample ID: Pile 6C
Sample Matrix: Solid

Date Sampled: 12/21/2007
Date Received: 12/24/2007

General Chemistry

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Ammonia (ASTM)	350.1(1)	0.35	0.10	mg/l	BRJ	01/08/2008	0069408-1	<0.10
Chemical Oxygen Demand (ASTM)	410.4(2)	31	25	mg/l	BKH	01/09/2008	0069459-1	<25
Cyanide (Reactive)	7.3.3.2/9014(2)	<1.1	1.1	mg/kg	SAB	01/04/2008	0069396-1	<1.0
Flash Point	1010(2)	>200	60	F	SAB	01/07/2008	N/A	N/A
Oil & Grease	9071B(2)	490	56	mg/kg	DLH	01/02/2008	0069336-1	<50
Oil & Grease (ASTM)	1664 ASTM	<5.0	5.0	mg/l	DLH	01/03/2008	0069300-1	<5.0
Paint Filter	9095(2)	PASS	N/A	n/a	DJ0	01/04/2008	N/A	N/A
pH	9045(2)	9.82	2.00	pH	DJT	01/07/2008	0069391-1	4.66
Sulfide (Reactive)	9030(2)	<11	11	mg/kg	SAB	01/04/2008	0069377-1	<10
Total Solids (ASTM)	160.3(2)	270	10	mg/l	DLH	01/08/2008	0069423-1	<10
Total Solids @105C	160.3	91	10	%	DLH	12/31/2007	0069351-1	<10
Total Volatile Solids	160.4(1)	<10	10	%	DLH	12/31/2007	0069352-1	<10

Inorganic Extraction

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Percent Solids	% Solids	90	N/A	%	DAB	12/26/2007	N/A	N/A

Metals

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Mercury, TCLP, CVAAS								
Mercury	7471(2)	<0.010	0.010	mg/l	CS0	01/03/2008	0069230-1	<0.010
Trace Metals, TCLP, ICP								
Arsenic	6010B(2)	<0.050	0.050	mg/l	PMM	12/31/2007	0069133-1	<0.050
Barium	6010B(2)	<1.0	1.0	mg/l	PMM	12/31/2007	0069133-1	<1.0
Cadmium	6010B(2)	<0.050	0.050	mg/l	PMM	12/31/2007	0069133-1	<0.050
Chromium	6010B(2)	<0.050	0.050	mg/l	PMM	12/31/2007	0069133-1	<0.050
Lead	6010B(2)	2.2	0.050	mg/l	PMM	12/31/2007	0069133-1	<0.050
Selenium	6010B(2)	<0.10	0.10	mg/l	PMM	12/31/2007	0069133-1	<0.10
Silver	6010B(2)	<0.050	0.050	mg/l	PMM	12/31/2007	0069133-1	<0.050

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Lab Sample ID: 0712-4716
Client Sample ID: Pile 6C

Pesticides/PCB
Pesticides/PCB

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Polychlorinated Biphenyls, ECD								
Aroclor-1016	8082(2)	<1.9	1.9	mg/kg	RDJ	01/03/2008	0069169-1	<1.0
Aroclor-1221	8082(2)	<1.9	1.9	mg/kg	RDJ	01/03/2008	0069169-1	<1.0
Aroclor-1232	8082(2)	<1.9	1.9	mg/kg	RDJ	01/03/2008	0069169-1	<1.0
Aroclor-1242	8082(2)	<1.9	1.9	mg/kg	RDJ	01/03/2008	0069169-1	<1.0
Aroclor-1248	8082(2)	11	1.9	mg/kg	RDJ	01/03/2008	0069169-1	<1.0
Aroclor-1254	8082(2)	<1.9	1.9	mg/kg	RDJ	01/03/2008	0069169-1	<1.0
Aroclor-1260	8082(2)	<1.9	1.9	mg/kg	RDJ	01/03/2008	0069169-1	<1.0
PCB Total-TCL	8082(2)	11	1.9	mg/kg	RDJ	01/03/2008	0069169-1	<1.0
Pesticides, TCLP, ECD								
gamma-BHC	8081(2)	<10	10	ug/l	SJG	01/05/2008	0069126-1	<10
Technical Chlordane	8081(2)	<10	10	ug/l	SJG	01/05/2008	0069126-1	<10
Endrin	8081(2)	<1.0	1.0	ug/l	SJG	01/05/2008	0069126-1	<1.0
Heptachlor	8081(2)	<0.50	0.50	ug/l	SJG	01/05/2008	0069126-1	<0.50
Heptachlor Epoxide	8081(2)	<0.50	0.50	ug/l	SJG	01/05/2008	0069126-1	<0.50
Methoxychlor	8081(2)	<100	100	ug/l	SJG	01/05/2008	0069126-1	<100
Toxaphene	8081(2)	<50	50	ug/l	SJG	01/05/2008	0069126-1	<50

Semivolatiles

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Semivolatile Organic Compounds, TCLP, GC/MS								
Cresol (Total)	8270C(2)	<5000	5000	ug/l	SPL	01/09/2008	0069227-1	<5000
1,4-Dichlorobenzene	8270C(2)	<500	500	ug/l	SPL	01/09/2008	0069227-1	<500
2,4-Dinitrotoluene	8270C(2)	<100	100	ug/l	SPL	01/09/2008	0069227-1	<100
Hexachlorobenzene	8270C(2)	<100	100	ug/l	SPL	01/09/2008	0069227-1	<100
Hexachlorobutadiene	8270C(2)	<100	100	ug/l	SPL	01/09/2008	0069227-1	<100
Hexachloroethane	8270C(2)	<500	500	ug/l	SPL	01/09/2008	0069227-1	<500
Nitrobenzene	8270C(2)	<100	100	ug/l	SPL	01/09/2008	0069227-1	<100
Pentachlorophenol	8270C(2)	<5000	5000	ug/l	SPL	01/09/2008	0069227-1	<5000
Pyridine	8270C(2)	<500	500	ug/l	SPL	01/09/2008	0069227-1	<500
2,4,5-Trichlorophenol	8270C(2)	<5000	5000	ug/l	SPL	01/09/2008	0069227-1	<5000
2,4,6-Trichlorophenol	8270C(2)	<100	100	ug/l	SPL	01/09/2008	0069227-1	<100

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Lab Sample ID: 0712-4716
Client Sample ID: Pile 6C

Subcontracted Work
Subcontracted Work

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Gamma Spectroscopy	PGH-R-023-B	Completed	N/A	n/a			N/A	N/A
Herbicides, TCLP, ECD								
2,4-D	8151A(2)	Completed	100	ug/l			N/A	N/A
2,4,5-TP	8151A(2)	Completed	10	ug/l			N/A	N/A

Volatiles

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Volatile Organic Compounds, TCLP, MS								
Benzene	8260B(2)	<50	50	ug/l	EAC	01/07/2008	0069382-1	<50
2-Butanone	8260B(2)	<5000	5000	ug/l	EAC	01/07/2008	0069382-1	<5000
Carbon Tetrachloride	8260B(2)	<50	50	ug/l	EAC	01/07/2008	0069382-1	<50
Chlorobenzene	8260B(2)	<1000	1000	ug/l	EAC	01/07/2008	0069382-1	<1000
Chloroform	8260B(2)	<500	500	ug/l	EAC	01/07/2008	0069382-1	<500
1,2-Dichloroethane	8260B(2)	<50	50	ug/l	EAC	01/07/2008	0069382-1	<50
1,1-Dichloroethene	8260B(2)	<50	50	ug/l	EAC	01/07/2008	0069382-1	<50
Tetrachloroethene	8260B(2)	<50	50	ug/l	EAC	01/07/2008	0069382-1	<50
Trichloroethene	8260B(2)	<50	50	ug/l	EAC	01/07/2008	0069382-1	<50
Vinyl chloride	8260B(2)	<50	50	ug/l	EAC	01/07/2008	0069382-1	<50

(1) U.S. Environmental Protection Agency, 1983, Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020, Environmental Monitoring and Support Laboratory, Cincinnati, Ohio.
(2) U.S. Environmental Protection Agency, 1983, Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020, Environmental Monitoring and Support Laboratory, Cincinnati, Ohio. Results only report those compounds that are soluble in the ASTM extraction.

Sample Comments: Results reported in dry weight equivalence. Spike recoveries for Oil and Grease are outside the QC range due to matrix interferences.

REPORT OF LABORATORY ANALYSIS

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Waltz Mill Radiochemistry Lab
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Bldg. G, M/S 62
Madison, PA 15663
Phone: 724.722.5214
Fax: 724.722.5208

January 16, 2008

Ms. Raelyn Sylvester
Pace Analytical Services, Inc
5203 Triangle Lane
Export, PA 15632

Soil Characterization
07-9918, URS
Pace Project No. 07-6168

Dear Ms. Sylvester:

Enclosed are analytical results for samples submitted by Pace Analytical Services, Inc. Samples were received on December 27, 2007 and logged in for analysis on January 2, 2008.

Methods used are indicated on the attached data table. Appropriate quality assurance/quality control analyses were performed in accordance with Pace, Waltz Mill Site Quality Assurance Plan. The results reported in this project meet the requirements as specified in Chapter 5 of the NELAC Standards. Any deviations or discrepancies from the NELAC standards are documented in the case narrative(s) of this report. If you have any questions, please call me at 724-722-5219.

Sincerely,

Richard M. Kinney
Radiochemistry Laboratory Supervisor

RMK:tew

Enclosures

REPORT OF LABORATORY ANALYSIS

ACCREDITED IN ACCORDANCE WITH nelac

PACE ANALYTICAL SERVICES, INC.
CASE NARRATIVE

I. PROJECT LOGIN INFORMATION:

A: PROJECT NUMBERS:

PACE: 07-6168
CLIENT: 07-9918, URS

B: SAMPLE IDENTIFICATIONS:

Pace ID	Client ID	Pace ID	Client ID
0712-1098	Pile 1&2	0712-1099	Pile 3, 4, & 5
0712-1100	Pile 6C		

C: SHIPPING/RECEIVING COMMENTS:

Final Report 01-16-08.

II. PREPARATION/ANALYSIS COMMENTS:

A: RADIOLOGICAL:

NONE

III. GENERAL COMMENTS:

Trailing zeroes and decimal places appearing on the data should not be interpreted as precision of the analytical procedure, but rather as a result of reporting format.

Sample(s) analyzed and reported on an as-received basis.

Table 1
General Data Table
Pace Analytical Services, Inc.
Pace Project No. 07-6168
Soil Characterization; 07-9918, URS

Parameter	Analytical Method	Units	Sample Identification 0712-1098 Pile 1&2 (12/21/07) Analyzed	Act ± Unc (MDC)	
Bi-214	PGH-R-023-3	pCi/g	01/04/08	0.769 ± 0.099	(0.020)
Pb-214	PGH-R-023-3	pCi/g	01/04/08	0.789 ± 0.086	(0.017)
Ra-226	PGH-R-023-3	pCi/g	01/04/08	2.62 ± 0.714	(0.230)
Ac-228	PGH-R-023-3	pCi/g	01/04/08	0.786 ± 0.131	(0.040)
Th-228	PGH-R-023-3	pCi/g	01/04/08	0.786 ± 0.131	(0.040)
Th-230	PGH-R-023-3	pCi/g	01/04/08	2.33 ± 0.621	(0.192)
Th-232	PGH-R-023-3	pCi/g	01/04/08	0.786 ± 0.131	(0.040)
U-234	PGH-R-023-3	pCi/g	01/04/08	2.33 ± 0.621	(0.192)
U-235	PGH-R-023-3	pCi/g	01/04/08	0.103 ± 0.032	(0.084)
U-238	PGH-R-023-3	pCi/g	01/04/08	2.33 ± 0.621	(0.192)

Act=Activity, Unc=2 sigma Uncertainty and (MDC)=the associated Minimum Detectable Concentration.

Table 1
(Continued)

Parameter	Analytical Method	Units	Sample Identification 0712-1099 Pile 3, 4, & 5 (12/21/07) Analyzed	Act ± Unc (MDC)	
Bi-214	PGH-R-023-3	pCi/g	01/04/08	0.934 ± 0.127	(0.042)
Pb-214	PGH-R-023-3	pCi/g	01/04/08	1.07 ± 0.145	(0.033)
Ra-226	PGH-R-023-3	pCi/g	01/04/08	3.29 ± 1.53	(0.729)
Ac-228	PGH-R-023-3	pCi/g	01/04/08	0.980 ± 0.193	(0.066)
Th-228	PGH-R-023-3	pCi/g	01/04/08	0.980 ± 0.193	(0.066)
Th-230	PGH-R-023-3	pCi/g	01/04/08	2.07 ± 1.75	(0.898)
Th-232	PGH-R-023-3	pCi/g	01/04/08	0.980 ± 0.193	(0.066)
U-234	PGH-R-023-3	pCi/g	01/04/08	2.07 ± 1.75	(0.898)
U-235	PGH-R-023-3	pCi/g	01/04/08	0.179 ± 0.085	(0.231)
U-238	PGH-R-023-3	pCi/g	01/04/08	2.07 ± 1.75	(0.898)

Act=Activity, Unc=2 sigma Uncertainty and (MDC)=the associated Minimum Detectable Concentration.

Table 1
(Continued)

Parameter	Analytical Method	Units	Sample Identification 0712-1100 Pile 6C (12/21/07) Analyzed	Act ± Unc (MDC)	
Bi-214	PGH-R-023-3	pCi/g	01/04/08	0.894 ± 0.107	(0.020)
Pb-214	PGH-R-023-3	pCi/g	01/04/08	0.992 ± 0.110	(0.021)
Ra-226	PGH-R-023-3	pCi/g	01/04/08	3.92 ± 1.06	(0.309)
Ac-228	PGH-R-023-3	pCi/g	01/04/08	1.04 ± 0.152	(0.042)
Th-228	PGH-R-023-3	pCi/g	01/04/08	1.04 ± 0.152	(0.042)
Th-230	PGH-R-023-3	pCi/g	01/04/08	1.45 ± 0.642	(0.303)
Th-232	PGH-R-023-3	pCi/g	01/04/08	1.04 ± 0.152	(0.042)
U-234	PGH-R-023-3	pCi/g	01/04/08	1.45 ± 0.642	(0.303)
U-235	PGH-R-023-3	pCi/g	01/04/08	0.174 ± 0.044	(0.096)
U-238	PGH-R-023-3	pCi/g	01/04/08	1.45 ± 0.642	(0.303)

Act=Activity, Unc=2 sigma Uncertainty and (MDC)=the associated Minimum Detectable Concentration.

Table 1
(Continued)

Parameter	Analytical Method	Units	Sample Identification 0712-1101 Method Blank (12/27/07) Analyzed	Act ± Unc (MDC)	
Bi-214	PGH-R-023-3	pCi/g	12/15/08	0.051 ± 0.040	(0.019)
Pb-214	PGH-R-023-3	pCi/g	12/15/08	0.033 ± 0.034	(0.018)
Ra-226	PGH-R-023-3	pCi/g	12/15/08	0.493 ± 0.392	(0.185)
Ac-228	PGH-R-023-3	pCi/g	12/15/08	0.043 ± 0.056	(0.031)
Th-228	PGH-R-023-3	pCi/g	12/15/08	0.043 ± 0.056	(0.031)
Th-230	PGH-R-023-3	pCi/g	12/15/08	0.401 ± 0.246	(0.111)
Th-232	PGH-R-023-3	pCi/g	12/15/08	0.043 ± 0.056	(0.031)
U-234	PGH-R-023-3	pCi/g	12/15/08	0.401 ± 0.246	(0.111)
U-235	PGH-R-023-3	pCi/g	12/15/08	0.028 ± 0.023	(0.054)
U-238	PGH-R-023-3	pCi/g	12/15/08	0.401 ± 0.246	(0.111)

Act=Activity, Unc=2 sigma Uncertainty and (MDC)=the associated Minimum Detectable Concentration.

CHAIN-OF-CUSTODY / Analytical Request Document

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The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: 1 of 1

1151366

Section A Required Client Information:

Company: URS Corp
Address: 501 Holiday Dr Ste 300
Pittsburgh PA 15220
Email To:
Phone: 412-503-4669 Fax:
Requested Due Date/TAT:

Section B Required Project Information:

Report To: Jeff Calarie
Copy To: URS Corp
Purchase Order No.:
Project Name: LI Tungsten Sampling
Project Number:

Section C Invoice Information:

Attention: Jeff Calarie
Company Name: URS Corp
Address: 501 Holiday Dr Ste 300
Pace Quote Reference:
Pace Project Manager:
Pace Profile #:

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER

Site Location STATE: NY

Section D Required Client Information

Matrix Codes MATRIX / CODE

Drinking Water	DW
Water	WT
Waste Water	WW
Product	P
Soil/Solid	SL
Oil	OL
Wipe	WP
Air	AR
Tissue	TS
Other	OT

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Requested Analysis Filtered (Y/N): Y/N	Analysis Test: VOC	Analysis Test: Waste Chloride 300.0	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	Pile 1	SL	G	12/21	07	12/21	1236 PM		1	X									X			12-4708
2	Pile 2	SL	G			12/21	1238 PM		1	X									X			09
3	Pile 3	SL	G			12/21	1242 PM		1	X									X			10
4	Pile 4	SL	G			12/21	1244 PM		1	X									X			11
5	Pile 5	SL	G			12/21	1247 PM		1	X									X			12
6	Pile 6	SL	G	V		12/21	1232 PM		1	X									X			13
7	Pile 1&2	SL	C	12/21	1301	12/21	1309		2	X										X		0712-14/1098
8	Pile 3&4&5	SL	C	12/21	1310	12/21	1318		2	X										X		15/1099
9	Pile 6C	SL	C	12/21	1250	12/21	1258		2	X										X		V 16/1100
10																						
11																						MB-1101
12																						

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
	Fed Ex -			C Yabocsky Pace	12-24-07	9:15	5	Y	N	Y
				Ken Kreider	12/27/07	14:00				

SAMPLER NAME AND SIGNATURE: Anping Zhang

PRINT Name of SAMPLER:

SIGNATURE of SAMPLER: DATE Signed (MM/DD/YY): 12/21/07

Temp in °C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

2

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

F-ALL-Q-020rev.07, 15-May-2007

Pace Analytical®
New Orleans Laboratory

Pace Analytical Services, Inc.
1000 Riverbend Blvd. Suite F
St. Rose , LA 70087

Phone: 504.469.0333
Fax: 504.469.0555
LELAP # 02006

January 09, 2008

Client Services
Pace Analytical - Pittsburgh
One Triangle Lane
Export, PA 15632

RE: Project: 2077411
RE: Project ID: 07-9918

Dear Client Services:

Enclosed are the analytical results for sample(s) received by the laboratory on December 27, 2007. Results reported herein conform to the most current NELAC standards, where applicable, unless otherwise narrated in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Karen Brown

ACCREDITED IN ACCORDANCE WITH nelac

REPORT OF LABORATORY ANALYSIS

Pace Analytical®
New Orleans Laboratory

Sample Cross Reference

Pace Analytical Services, Inc.
1000 Riverbend Blvd. Suite F
St. Rose , LA 70087

Phone: 504.469.0333
Fax: 504.469.0555
LELAP # 02006

Project: 2077411

Client: PASI Pittsburgh

Project ID: 07-9918

Client Sample ID	Lab ID	Matrix	Collection Date/Time	Received Date/Time
0712-4714	20579485	Soil	21-Dec-07 13:09	27-Dec-07 10:30
0712-4715	20579486	Soil	21-Dec-07 13:18	27-Dec-07 10:30
0712-4716	20579487	Soil	21-Dec-07 12:58	27-Dec-07 10:30

1/9/2008 16:11:32

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New Orleans Laboratory

Project Narrative

Pace Analytical Services, Inc.
1000 Riverbend Blvd. Suite F
St. Rose , LA 70087

Phone: 504.469.0333
Fax: 504.469.0555
LELAP # 02006

Project: 2077411

Sample Receipt Condition:

All samples were received in accordance with EPA protocol.

Holding Times:

All holding times were met.

Blanks:

All blank results were below reporting limits.

Laboratory Control Samples:

All LCS recoveries were within QC limits.

Matrix Spikes and Duplicates:

MS or MSD recoveries outside of QC limits are qualified in the Report of Quality Control section.

Surrogates:

All surrogate recoveries were within QC limits.

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New Orleans Laboratory

Project Narrative

Pace Analytical Services, Inc.
1000 Riverbend Blvd. Suite F
St. Rose , LA 70087

Phone: 504.469.0333
Fax: 504.469.0555
LELAP # 02006

Project: 2077411

Analytical Method	Batch	Sample used for QC
EPA 8151	96180	Project sample 0712-4714

1/9/2008 16:12:32

For the sample used as the original for the DUP or MS/MSD for the batch:

Project sample means a sample from this project was used.
Client sample means a sample from the same client but in a different project was used.
Batch sample means a sample from the a different client was used.

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Sample Results

Pace Analytical Services, Inc.
1000 Riverbend Blvd. Suite F
St. Rose , LA 70087

Phone: 504.469.0333
Fax: 504.469.0555
LELAP # 02006

Client: PASI Pittsburgh

Client ID: 0712-4714
Project: 2077411
Project ID: 07-9918
Site: None
Lab ID: 20579485 (TCLP)
Matrix: Soil
% Moisture: 0 Not Corrected
Description: None
Prep Level: TCLP
Batch: 96180
Method: 8151 Herbs TCLP

Collected: 21-Dec-07
Received: 27-Dec-07
Prepared: 03-Jan-08
Analyzed: 08-Jan-08 21:55 SNP1

Units: mg/L

CAS Number	Analyte	Dilution	Qu	Result	Reporting Limit	Reg Limit
94-75-7	2,4-D	1		ND	0.0200	10.0
93-72-1	2,4,5-TP (Silvex)	1		ND	0.0200	1.00

2 compound(s) reported

1/9/2008 16:12:48

ND denotes Not Detected at or above the adjusted reporting limit or PQL.
MDL denotes method detection limit

Limits are corrected for sample size, dilution and moisture content if applicable.
Qu lists qualifiers. Specific qualifiers are defined at the end of the report.
For moisture results, wet denotes result is not corrected for moisture and n/a denotes not applicable.
Regulatory limit may denote an actual regulatory limit or a client-requested notification limit.

Louisiana Dept. of Environmental Quality (LELAP) - 02006
Louisiana Dept. of Health and Hospitals / Drinking Water - LA050004
Arkansas Dept. of Environmental Quality - LA050004
Florida Dept. of Health (NELAC) - E87595
Kansas Dept. of Health Environmental - E-10266
Pennsylvania DEP (NELAC) 68-04202
U.S. Dept. of Agricultural Foreign Soil Permit - S-47270

0029

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New Orleans Laboratory

Sample Results

Pace Analytical Services, Inc.
1000 Riverbend Blvd. Suite F
St. Rose , LA 70087

Phone: 504.469.0333
Fax: 504.469.0555
LELAP # 02006

Client: PASI Pittsburgh

Client ID: 0712-4715
Project ID: 07-9918
Lab ID: 20579486 (TCLP)
Description: None
Method: 8151 Herbs TCLP

Project: 2077411
Site: None
Matrix: Soil
Prep Level: TCLP

% Moisture: 0 Not Corrected
Batch: 96180

Collected: 21-Dec-07
Received: 27-Dec-07
Prepared: 04-Jan-08
Analyzed: 09-Jan-08 00:14 SNP1

Units: mg/L

CAS Number	Analyte	Dilution	Qu	Result	Reporting Limit	Reg Limit
94-75-7	2,4-D	1	Ph	0.0784	0.0200	10.0
93-72-1	2,4,5-TP (Silvex)	1		ND	0.0200	1.00

2 compound(s) reported

1/9/2008 16:12:48

ND denotes Not Detected at or above the adjusted reporting limit or PQL.
MDL denotes method detection limit

Limits are corrected for sample size, dilution and moisture content if applicable.
Qu lists qualifiers. Specific qualifiers are defined at the end of the report.
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Regulatory limit may denote an actual regulatory limit or a client-requested notification limit.

Louisiana Dept. of Environmental Quality (LELAP) - 02006
Louisiana Dept. of Health and Hospitals / Drinking Water - LA050004
Arkansas Dept. of Environmental Quality - LA050004
Florida Dept. of Health (NELAC) - E87595
Kansas Dept. of Health Environmental - E-10266
Pennsylvania DEP (NELAC) 68-04202
U.S. Dept. of Agricultural Foreign Soil Permit - S-47270

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New Orleans Laboratory

Sample Results

Pace Analytical Services, Inc.
1000 Riverbend Blvd. Suite F
St. Rose , LA 70087

Phone: 504.469.0333
Fax: 504.469.0555
LELAP # 02006

Client: PASI Pittsburgh

Client ID: 0712-4716
Project ID: 07-9918
Lab ID: 20579487 (TCLP)
Description: None
Method: 8151 Herbs TCLP

Project: 2077411
Site: None
Matrix: Soil
Prep Level: TCLP

% Moisture: 0 Not Corrected
Batch: 96180

Collected: 21-Dec-07
Received: 27-Dec-07
Prepared: 04-Jan-08
Analyzed: 09-Jan-08 00:41 SNP1

Units: mg/L

CAS Number	Analyte	Dilution	Qu	Result	Reporting Limit	Reg Limit
94-75-7	2,4-D	1		ND	0.0200	10.0
93-72-1	2,4,5-TP (Silvex)	1		ND	0.0200	1.00

2 compound(s) reported

1/9/2008 16:12:48

ND denotes Not Detected at or above the adjusted reporting limit or PQL.
MDL denotes method detection limit

Limits are corrected for sample size, dilution and moisture content if applicable.
Qu lists qualifiers. Specific qualifiers are defined at the end of the report.
For moisture results, wet denotes result is not corrected for moisture and n/a denotes not applicable.
Regulatory limit may denote an actual regulatory limit or a client-requested notification limit.

Louisiana Dept. of Environmental Quality (LELAP) - 02006
Louisiana Dept. of Health and Hospitals / Drinking Water - LA050004
Arkansas Dept. of Environmental Quality - LA050004
Florida Dept. of Health (NELAC) - E87595
Kansas Dept. of Health Environmental - E-10266
Pennsylvania DEP (NELAC) 68-04202
U.S. Dept. of Agricultural Foreign Soil Permit - S-47270

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New Orleans Laboratory

Organics Quality Control

Pace Analytical Services, Inc.
1000 Riverbend Blvd. Suite F
St. Rose , LA 70087

Phone: 504.469.0333
Fax: 504.469.0555
LELAP # 02006

Method: EPA 8151 **Project:** 2077411 **LCS:** 20580247 08-Jan-08 21:27

Batch: 96180 **MS:** 20580248 08-Jan-08 22:22

MSD: 20580249 08-Jan-08 22:50

Units: mg/L **Original for MS:** 20579485 Client Sample

Parameter Name	LCS Spike	LCS Found	LCS %Rec	MS Spike	Sample Found	MS Found	MSD Found	MS %Rec	MSD %Rec	MSD RPD	QC Limits LCS	QC Limits MS/MSD	Max RPD	Qu
2,4-D	0.1	0.1028	103	0.1	0.00	0.1421	0.1115	142	112	24 *	25 - 163	10 - 182	20	
2,4,5-TP (Silvex)	0.01	0.0104	104	0.01	0.00	0.01418	0.01162	142	116	20	30 - 165	15 - 174	20	

2 compound(s) reported

1/9/2008 16:13:04

* denotes recovery outside of QC limits.

MS/MSD RPD is calculated via SW-846 rules on the basis of spiked sample concentrations rather than spike recoveries.

Louisiana Dept. of Environmental Quality (LELAP) - 02006
Louisiana Dept. of Health and Hospitals / Drinking Water - LA050004
Arkansas Dept. of Environmental Quality - LA050004
Florida Dept. of Health (NELAC) - E87595
Kansas Dept. of Health Environmental - E-10266
Pennsylvania DEP (NELAC) 68-04202
U.S. Dept. of Agricultural Foreign Soil Permit - S-47270

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New Orleans Laboratory

Organics Quality Control

Pace Analytical Services, Inc.
1000 Riverbend Blvd. Suite F
St. Rose , LA 70087

Phone: 504.469.0333
Fax: 504.469.0555
LELAP # 02006

Method: EPA 8151 **Project:** 2077411 **LCS:** 20580590 08-Jan-08 23:46

Batch: 96180 **MS:**

MSD:

Units: mg/L **Original for MS:**

Parameter Name	LCS Spike	LCS Found	LCS %Rec	MS Spike	Sample Found	MS Found	MSD Found	MS %Rec	MSD %Rec	MSD RPD	QC Limits LCS	QC Limits MS/MSD	Max RPD	Qu
2,4-D	0.1	0.1183	118								25 - 163	-		
2,4,5-TP (Silvex)	0.01	0.01039	104								30 - 165	-		

2 compound(s) reported

1/9/2008 16:13:04

* denotes recovery outside of QC limits.

MS/MSD RPD is calculated via SW-846 rules on the basis of spiked sample concentrations rather than spike recoveries.

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Surrogate Recovery

Pace Analytical Services, Inc.
1000 Riverbend Blvd. Suite F
St. Rose , LA 70087

Phone: 504.469.0333
Fax: 504.469.0555
LELAP # 02006

Batch: 96180 **Project:** 2077411

Lab ID	Sample ID	Qu	Sur 1 %Rec	Sur 2 %Rec	Sur 3 %Rec	Sur 4 %Rec	Sur 5 %Rec	Sur 6 %Rec	Sur 7 %Rec	Sur 8 %Rec
20579485	0712-4714		105	105						
20580248	0712-4714MS 1		131	124						
20580249	0712-4714MSD 1		104	101						
20579486	0712-4715		124	119						
20579487	0712-4716		121	121						
20580246	96180 BLANK 1		95	93						
20580589	96180 BLANK 2		125	115						
20580247	96180 LCS 1		98	96						
20580590	96180 LCS 2		108	107						
	QC limits:		10-181	10-181						

Sur 1: 2,4-DCPA (Conf)(S)
Sur 2: 2,4-DCPA (S)

1/9/2008 16:13:20

*** denotes surrogate recovery outside of QC limits.**
D denotes surrogate recovery is outside of QC limits due to sample dilution, and is not considered an excursion.

Louisiana Dept. of Environmental Quality (LELAP) - 02006
Louisiana Dept. of Health and Hospitals / Drinking Water - LA050004
Arkansas Dept. of Environmental Quality - LA050004
Florida Dept. of Health (NELAC) - E87595
Kansas Dept. of Health Environmental - E-10266
Pennsylvania DEP (NELAC) 68-04202
U.S. Dept. of Agricultural Foreign Soil Permit - S-47270

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Pace Analytical®
New Orleans Laboratory

Organics Method Blank

Pace Analytical Services, Inc.
1000 Riverbend Blvd. Suite F
St. Rose , LA 70087

Phone: 504.469.0333
Fax: 504.469.0555
LELAP # 02006

Blank ID: 96180 BLANK 1 **Project:** 2077411

Lab ID: 20580246

Description: 8151 Herbs TCLP Blank **Prep Level:** TCLP **Batch:** 96180

Method: TCLP EPA 8151 (TCLP)

Prepared: 03-Jan-08 **Analyzed:** 08-Jan-08 20:59

Units: mg/L

CAS Number	Analyte	Dilution	Qu	Result	Reporting Limit
94-75-7	2,4-D	1		ND	0.0200
93-72-1	2,4,5-TP (Silvex)	1		ND	0.0200

2 compound(s) reported

1/9/2008 16:13:36

ND denotes Not Detected at or above the adjusted reporting limit or PQL.
MDL denotes method detection limit

Limits are corrected for sample size, dilution and moisture content if applicable.
Qu lists qualifiers. Specific qualifiers are defined at the end of the report.
For moisture results, wet denotes result is not corrected for moisture and n/a denotes not applicable.
Regulatory limit may denote an actual regulatory limit or a client-requested notification limit.

Louisiana Dept. of Environmental Quality (LELAP) - 02006
Louisiana Dept. of Health and Hospitals / Drinking Water - LA050004
Arkansas Dept. of Environmental Quality - LA050004
Florida Dept. of Health (NELAC) - E87595
Kansas Dept. of Health Environmental - E-10266
Pennsylvania DEP (NELAC) 68-04202
U.S. Dept. of Agricultural Foreign Soil Permit - S-47270

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Pace Analytical®
New Orleans Laboratory

Organics Method Blank

Pace Analytical Services, Inc.
1000 Riverbend Blvd. Suite F
St. Rose , LA 70087

Phone: 504.469.0333
Fax: 504.469.0555
LELAP # 02006

Blank ID: 96180 BLANK 2 **Project:** 2077411

Lab ID: 20580589

Description: 8151 Herbs TCLP Blank **Prep Level:** TCLP **Batch:** 96180

Method: TCLP EPA 8151 (TCLP)

Prepared: 04-Jan-08 **Analyzed:** 08-Jan-08 23:18

Units: mg/L

CAS Number	Analyte	Dilution	Qu	Result	Reporting Limit
94-75-7	2,4-D	1		ND	0.0200
93-72-1	2,4,5-TP (Silvex)	1		ND	0.0200

2 compound(s) reported

1/9/2008 16:13:36

ND denotes Not Detected at or above the adjusted reporting limit or PQL.
MDL denotes method detection limit

Limits are corrected for sample size, dilution and moisture content if applicable.
Qu lists qualifiers. Specific qualifiers are defined at the end of the report.
For moisture results, wet denotes result is not corrected for moisture and n/a denotes not applicable.
Regulatory limit may denote an actual regulatory limit or a client-requested notification limit.

Louisiana Dept. of Environmental Quality (LELAP) - 02006
Louisiana Dept. of Health and Hospitals / Drinking Water - LA050004
Arkansas Dept. of Environmental Quality - LA050004
Florida Dept. of Health (NELAC) - E87595
Kansas Dept. of Health Environmental - E-10266
Pennsylvania DEP (NELAC) 68-04202
U.S. Dept. of Agricultural Foreign Soil Permit - S-47270

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New Orleans Laboratory

Qualifier Summary

Pace Analytical Services, Inc.
1000 Riverbend Blvd. Suite F
St. Rose , LA 70087

Phone: 504.469.0333
Fax: 504.469.0555
LELAP # 02006

Project: 2077411

Qualifier	Qualifier Description
Ph	The relative percent difference between the two detectors is greater than 40%, indicating interference on one or more detectors. The higher of the two values is reported.

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

2077411

Page: 1 of 1

1151366

Section A Required Client Information:

Company:	URS Corp
Address:	501 Holiday Dr Ste 300 Pittsburgh PA 15220
Email To:	
Phone:	412-503-4669
Fax:	
Requested Due Date/TAT:	

Section B Required Project Information:

Report To:	Jeff Calarie
Copy To:	URS Corp
Purchase Order No.:	
Project Name:	Li Tungsten Sampling
Project Number:	

Section C Invoice Information:

Attention:	Jeff Calarie
Company Name:	URS Corp
Address:	501 Holiday Dr Ste 300
Pace Quote Reference:	
Pace Project Manager:	
Pace Profile #:	

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER ______

Site Location STATE: NY

Section D Required Client Information

Matrix Codes MATRIX / CODE: Drinking Water DW; Water WT; Waste Water WW; Product P; Soil/Solid SL; Oil OL; Wipe WP; Air AR; Tissue TS; Other OT

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Requested Analysis Filtered (Y/N): VOC – N; Waste Characterization – N

Pace Project No./ Lab I.D.: 07-09918

ITEM #	SAMPLE ID	MATRIX CODE	SAMPLE TYPE (G=GRAB C=COMP)	COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	VOC	Waste Characterization	(analysis area notes)	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	Pile 1	SL	G			12/21/07	1236 PM		1	X								X				12-4708
2	Pile 2	SL	G			↓	1238 PM		1	X								X				09
3	Pile 3	SL	G			↓	1242 PM		1	X								X				10
4	Pile 4	SL	G			↓	1244 PM		1	X								X				11
5	Pile 5	SL	G			↓	1247 PM		1	X								X				12
6	Pile 6	SL	G			↓	1232 PM		1	X								X		20579		13
7	Pile 1 & 2	SL	C	12/21	1301	12/21	1309		2	X									X	485		14
8	Pile 3 & 4 & 5	SL	C	12/21	1310	12/21	1318		2	X									X	486		15
9	Pile 6C	SL	C	12/21	1250	12/21	1258		2	X									X	487		16
10																						
11																						
12																						

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
	Fed Ex -			C Urbowitz Pace	12-24-07	9:15	5	Y	N	Y
	C Urbowitz Pace	12-26-07	5:00							
	Fed Ex	12-27-07	1030	[signature] Pace	12-27-07	1030	2.3 #1	y	y	y

SAMPLER NAME AND SIGNATURE: Anping Zheng

PRINT Name of SAMPLER:

SIGNATURE of SAMPLER: [signature]

DATE Signed (MM/DD/YY): 12/21/07

2

...t terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

F-ALL-Q-020rev.07, 15-May-2007

Pace Analytical

1000 Riverbend. Blvd., Suite F
St. Rose, LA 70087

Sample Condition Upon Receipt

2077411 PASI-PITT

Project #: 29

Courier: ☐ Pace Courier ☐ Hackbarth ☐ Fed X ☐ UPS ☐ DHL ☐ USPS ☐ Customer ☐ Other

Custody Seal on Cooler/Box Present: [see COC] **Custody Seals Intact:** ☑Yes ☐No

Therometer Used: ▫ Therm Fisher IR 1 ▫ Therm Fisher IR 2

Type of Ice: (Wet) Blue None

Samples on ice: [see COC]

Cooler Temperature: [see COC]

Temp should be above freezing to 6°C

Date and initials of person examining contents: 12-27-07

Temp must be measured from Temperature blank when present

		Comments:
Temperature Blank Present"?	☑Yes ☐No ☐N/A	1
Chain of Custody Present:	☑Yes ☐No ☐N/A	2
Chain of Custody Complete:	☑Yes ☐No ☐N/A	3
Chain of Custody Relinquished:	☑Yes ☐No ☐N/A	4
Sampler Name & Signature on COC:	☑Yes ☐No ☐N/A	5
Samples Arrived within Hold Time:	☑Yes ☐No ☐N/A	6
Sufficient Volume:	☑Yes ☐No ☐N/A	7
Correct Containers Used:	☑Yes ☐No ☐N/A	8
Filtered vol. Rec. for Diss. tests	☐Yes ☐No ☑N/A	9
Sample Labels match COC:	☑Yes ☐No ☐N/A	10
All containers received within manafacture's precautionary and/or expiration dates.	☑Yes ☐No ☐N/A	11
All containers needing preservation have been checked (except VOA, coliform, & O&G).	☐Yes ☐No ☑N/A	12
All containers preservation checked found to be in compliance with EPA recommendation.	☐Yes ☐No ☑N/A	13 If No, was preserative added? ▫Yes ▫No If added record lot no.: HNO3 _____ H2SO4 _____
Samples checked for dechlorination:	☐Yes ☐No ☑N/A	14
Headspace in VOA Vials (>6mm):	☐Yes ☐No ☑N/A	14
Trip Blank Present:	☐Yes ☐No ☑N/A	16
Trip Blank Custody Seals Present	☐Yes ☐No ☑N/A	17
Pace Trip Blank Lot # (if purchased): N/A		18

Client Notification/ Resolution:

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

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www.pacelabs.com

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: 1 of 1

1151366

Section A Required Client Information:

Company: URS Corp
Address: 501 Holiday Dr Ste 300
Pittsburgh PA 15220
Email To:
Phone: 412-503-4619 Fax:
Requested Due Date/TAT:

Section B Required Project Information:

Report To: Jeff Calarie
Copy To: URS Corp
Purchase Order No.:
Project Name: Li Tungsten Sampling
Project Number:

Section C Invoice Information:

Attention: Jeff Calarie
Company Name: URS Corp
Address: 501 Holiday Dr Ste 300
Pace Quote Reference:
Pace Project Manager:
Pace Profile #:

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER

Site Location STATE: NY

Section D Required Client Information

SAMPLE ID
(A-Z, 0-9 / ,-)
Sample IDs MUST BE UNIQUE

Matrix Codes (MATRIX / CODE)

Drinking Water	DW
Water	WT
Waste Water	WW
Product	P
Soil/Solid	SL
Oil	OL
Wipe	WP
Air	AR
Tissue	TS
Other	OT

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED: COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N: VOC	Volatile Chlorinated Hydrocarbons	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	Pile 1	SL	G	12/12/07		1236 PM			1	X								X			07-09918
2	Pile 2	SL	G			1238 PM			1	X								X			09
3	pile 3	SL	G			1242 PM			1	X								X			10
4	pile 4	SL	G			1244 PM			1	X								X			11
5	pile 5	SL	G			1247 PM			1	X								X			12
6	pile 6	SL	G			1232 PM			1	X								X			13
7	pile 1&2	SL	C	12/12	1301	12/12	1309		2	X									X		14
8	pile 3&4&5	SL	C	12/12	1310	12/12	1318		2	X									X		15
9	pile 6C	SL	C	12/12	1250	12/12	1258		2	X									X		16
10																					
11																					
12																					

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS: Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
	Fed Ex			Courier Pace	12.24.07	9:15	5	X	N	Y

SAMPLER NAME AND SIGNATURE: Anping Zheng
PRINT Name of SAMPLER:
SIGNATURE of SAMPLER:
DATE Signed (MM/DD/YY): 12/21/07

3

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

F-ALL-Q-020rev.07, 15-May-2007

Attachment D

Remedial Action Work Plan

February 2008

Remedial Action Work Plan
Soil Loadout and Building Decontamination
of the Dickson Warehouse
Li Tungsten Superfund Site
Glen Cove, New York

Revision 1

November 2007

Jeffrey J. Calarie
Senior Project Manager
URS Corporation

Date: 11-21-07

Ellen C. Jakub
Health Physicist
Safety and Ecology Corporation

Date: 11/21/07

Andrew J. Lombardo, CHP
Principal
Safety and Ecology Corporation

Date: 11/21/07

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Civil and Environmental Consultants, Inc

Date: _____

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Remedial Action Work Plan

Table of Contents

Remedial Action Work Plan
Soil Loadout and Building Decontamination
of the Dickson Warehouse
Li Tungsten Superfund Site
Glen Cove, New York

1.0 Introduction

On behalf of TDY Holdings, LLC (TDY) and in conformance with the 1999 Record of Decision, Li Tungsten Corporation Superfund Site, Nassau County, New York (1999 ROD), and the Consent Judgment, US v. AGI-VR/Wesson et al. of 2007 (Judgment), URS Corporation and Safety and Ecology Corporation (URS/SEC) have prepared this Remedial Action Work Plan (RAWP). This RAWP includes a detailed description of the soil loadout and building decontamination of the Dickson Warehouse (the Dickson Warehouse Work), including technical approach, operations, monitoring, and overall management strategy for implementing the following remedial action scope of work:

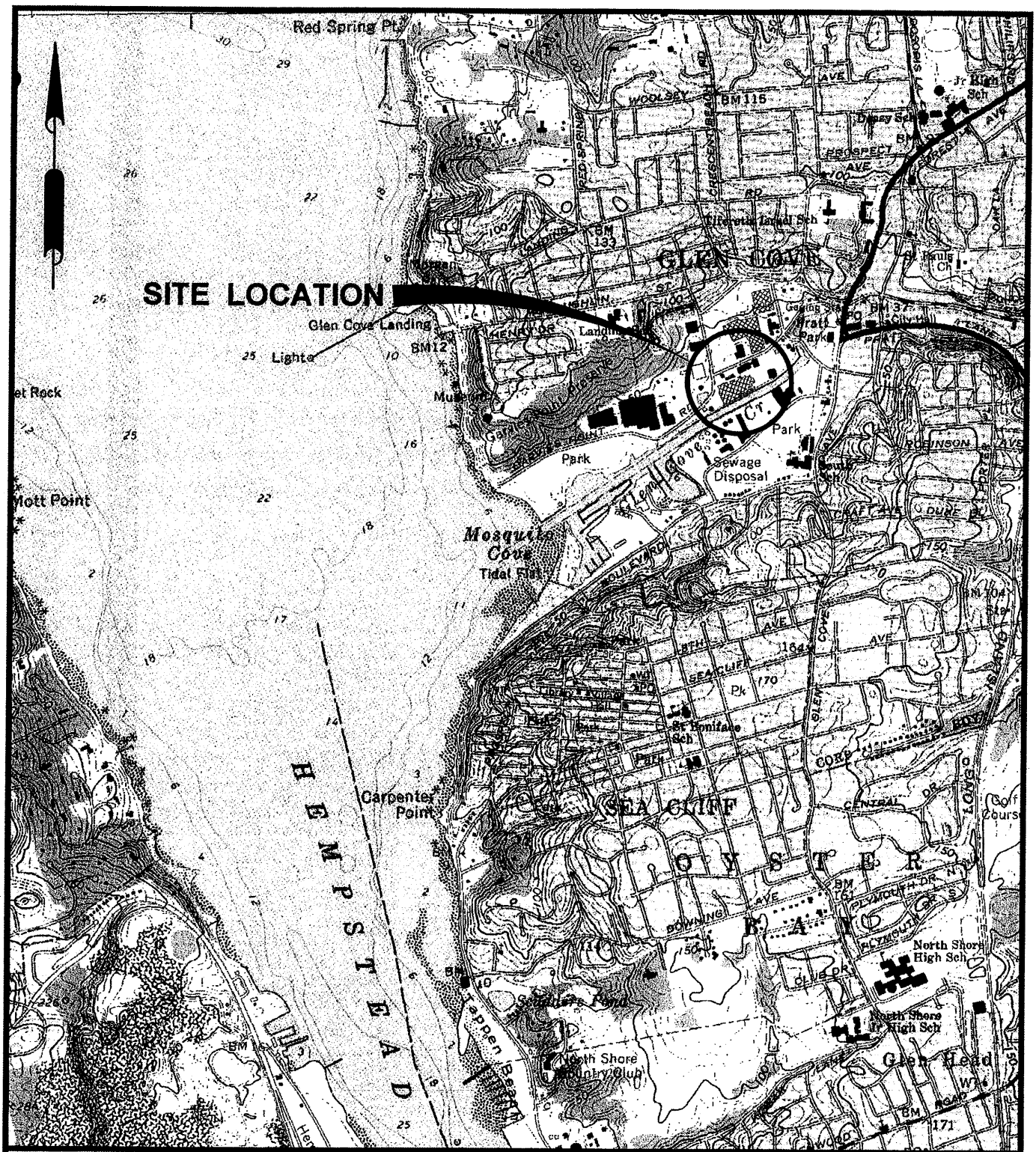
- The loading of approximately 5,500 cubic yards of staged soils in the Dickson Warehouse on Parcel C of the Li Tungsten Superfund Site. There are approximately 2,444 cubic yards of RCRA contaminated soils, 30 cubic yards of metals contaminated soils, 835 cubic yards of PCB contaminated soils, and 2,196 cubic yards of radiological contaminated soil.
- Stabilization of the 2,444 cubic yards of RCRA (lead) contaminated soils.
- Decontamination of the Dickson Warehouse.
- Radiological final status survey of the Dickson Warehouse.
- Preparation of the Final Report.

This RAWP has been formatted to provide the information required by the Judgment in a logical manner. Chapter 1.0 provides the introduction to the RAWP. Chapter 2.0 presents pertinent site background information. Chapter 3.0 identifies the Project Team and a brief description of team member responsibilities. Chapter 4.0 is the Site Management Plan, which provides necessary information regarding site operations. Chapter 5.0 is the Waste Management Plan, written to provide specific information concerning material management during the project. Finally, Chapter 6.0 presents deliverable and scheduling information. Appendix A to the RAWP is the Sampling and Analysis Plan; Appendix B is the Health and Safety Plan; Appendix C is the Quality Assurance Project Plan; and Appendix D is the Truck Pre-Transportation Release Plan.

2.0 Site Background

The Li Tungsten Superfund Site is located in the City of Glen Cove, Nassau County, New York, and includes the former Li Tungsten Corporation facility at Herbhill Road and Dickson Lane (see Figure 1). As a result of processing of ores at the facility on the Li Tungsten property, and the subsequent disposal of portions of the byproducts of that processing, elevated levels of radiation and certain metals had come to be present at or in the vicinity of the Li Tungsten property. The property is approximately 26 acres.

From April 2006 to August 2007, "ECC" activities based on a remedy selected in the 1999 ROD were performed on Parcels B and C of the Li Tungsten Superfund Site that included the excavation and segregation of contaminated soils. After the "ECC" operation, approximately 2,444 cubic yards of RCRA contaminated soils, 30 cubic yards of metals contaminated soils, 835 cubic yards of PCB contaminated soils, and 2,196 cubic yards of radiological contaminated soil remained stockpiled in the Dickson Warehouse located on Parcel C of the Li Tungsten Superfund Site.



QUADRANGLE LOCATION

0 2000 4000

SCALE IN FEET

REFERENCE:

BASE MAP IS A PORTION OF THE U.S.G.S. 7.5 MINUTE TOPOGRAPHIC SERIES SEA CLIFF, NY QUADRANGLE. DATED: 1968, PHOTOREVISED: 1979, SCALE: 1"=2000', CONTOUR INTERVAL IS 20 FEET. NGVD 1929.

URS

PITTSBURGH, PENNSYLVANIA 15205

REMEDIAL ACTION WORK PLAN
SITE LOCATION MAP

LITUNGSTEN PROPERTY SUPERFUND SITE — GLEN COVE, NY

CLIENT: ?	JOB NUMBER: 41785926	
SCALE: AS SHOWN	FIGURE NUMBER 1	REV 0

FILE: \LITUNGSTEN\FIG-1_USGS

01000009000700K0G

Site-wide soil cleanup levels established by the EPA, as part of the ROD and revised by the Explanation of Significant Differences, are summarized in the Table 1-1.

Table 1-1

Site-Wide Cleanup Levels

Parameter	Cleanup Levels
Arsenic (soil)	24 mg/kg
Lead (soil)	400 mg/kg
Arsenic (sediments)[a]	6 mg/kg
Lead (sediments)[a]	31 mg/kg
Thorium-230 + Thorium-232 (soil)	≤ 5 pCi/g plus background level[b]
Radium-226 + Radium-228 (soil)	≤ 5 pCi/g plus background level[b]
PCBs in the dumping area (middle) of Parcel B (soil)	1 mg/kg in the top 2 feet
PCBs in the dumping area (middle) of Parcel B (soil)	10 mg/kg below the top 2 feet

[a] There are no locations in Parcels B and Upper Parcel C to which the criteria apply. Sediment criteria were obtained from the *Technical Guidance For Screening Contaminated Sediment,* (Technical Guidance). Criteria are identified as "To Be Considered" ARARs. As defined in the Technical Guidance, sediments are "a collection of fine-, medium-, and coarse- grain materials and organic particles that are found at the bottom of lakes and ponds, rivers and streams, bays, estuaries, and oceans". Criteria for arsenic and lead are based on oligotrophic waters with low concentrations of metals-complexing ligands and are over protective when applied to eutrophic waters. (The Technical Guidance further cautions that a decision to remediate should not be based on exceedances of these criteria.) No areas have been identified within Parcels B and Upper Parcel C that meet the definition of sediment or the criteria upon which the sediment screening criteria are based.

[b] Background levels are 1 picocurie per gram (pCi/g) each for Th-230, Th-232, Ra-226, and Ra-228.

3.0 Remedial Action Project Team

Several entities will be responsible for the completion of the subject Remedial Action. The following narrative identifies the principal Remedial Action Project Team members and provides a brief description of the team member duties. An organizational chart for the loadout of contaminated soil, building decontamination, and radiological survey activities is presented in Figure 2.

USEPA Remedial Project Manager

The current USEPA Remedial Project Manager (RPM) for the Remedial Action is Mr. Edward Als, RPM, USEPA Emergency and Remedial Response Division, 290 Broadway / 20th Floor, New York, NY 1007-1866. The USEPA, including the RPM, will conduct oversight of the implementation of the Judgment. The RPM shall have the authority to halt, conduct, or direct any work required by the Judgment, or to direct any other response action undertaken by USEPA or URS/SEC at the property. Absence of the RPM from the property shall not be cause for stoppage of work unless specifically directed by the RPM.

Project Coordinator

The Project Coordinator for the Remedial Action is Mr. Edgard Bertaut, Pittsburgh, Pennsylvania. The Project Coordinator is TDY's authorized representative who is responsible for oversight of the implementation of the Judgment. To the greatest extent possible, the Project Coordinator will be present on site or readily available during site work. The Project Coordinator has the technical expertise to adequately oversee all aspects of the work contemplated by the Judgment.

Project Manager – Soil Loadout and Building Decontamination (URS Corporation)

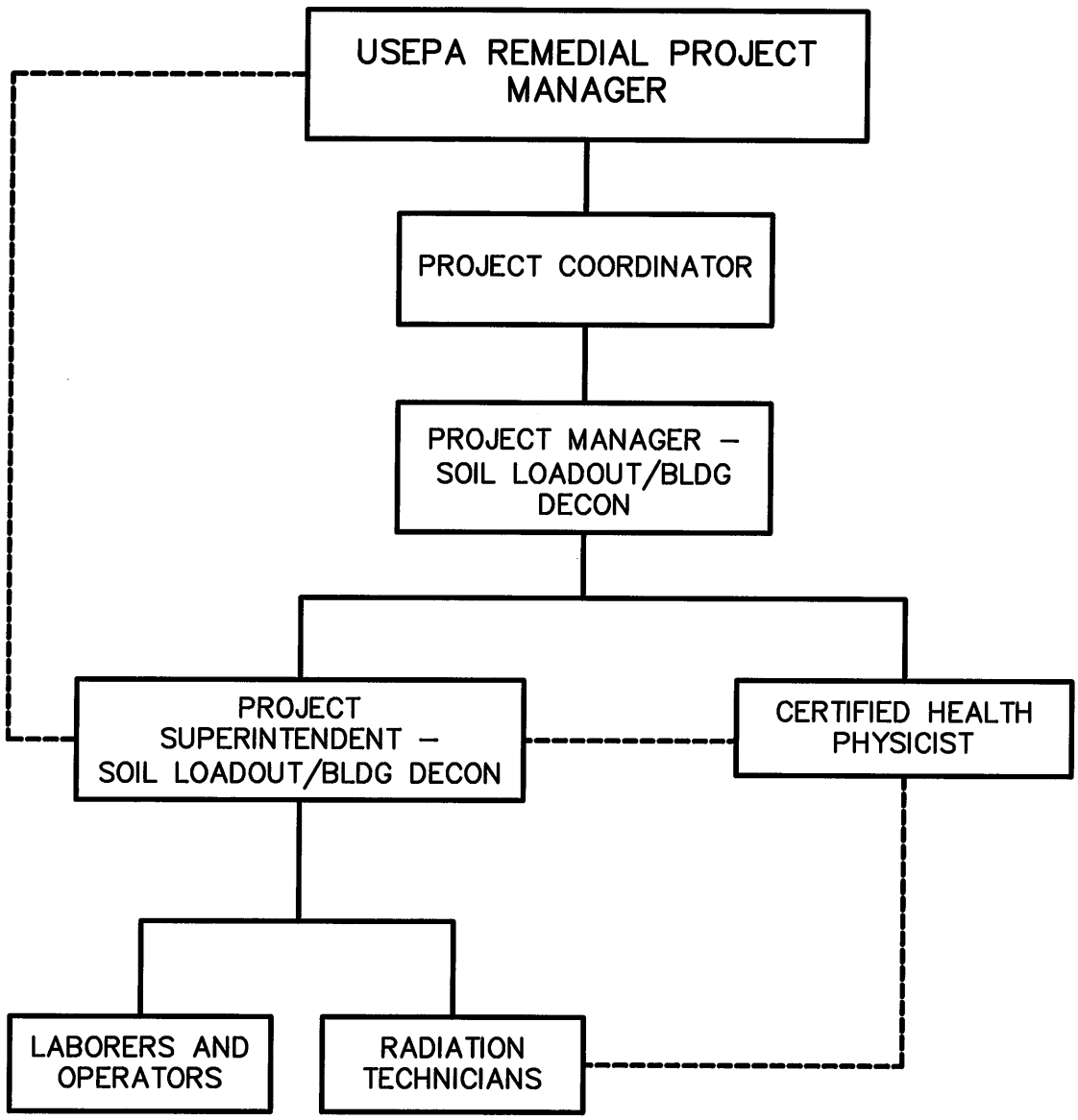
The Project Manager for the Dickson Warehouse Work scope is Mr. Jeffrey J. Calarie, URS' Pittsburgh, Pennsylvania. The Project Manager will be based in URS' Pittsburgh, Pennsylvania office and will be responsible for managing the soil loadout and building decontamination, on behalf of TDY, in accordance with terms and conditions of the contract and the RAWP. The Project Manager will direct and assist the Project Superintendent – Soil Loadout and Building Decontamination based at the Li Tungsten property. The Project Manager will serve as the point of contact for the USEPA RPM and Project Coordinator to address project related concerns requiring management level decisions and input. The Project Manager will also be responsible for administrative issues concerning invoicing, resource allocation, and scheduling.

Project Superintendent – Soil Loadout and Building Decontamination (URS Corporation)

The Project Superintendent for the Dickson Warehouse Work will be Mr. William Vester, URS, Pittsburgh, Pennsylvania. The Project Superintendent will be present on site during the soil loadout and building decontamination activities and will be responsible for the day-to-day management of the project. He will answer directly to the Project Manager – Soil Loadout and Building Decontamination and will serve as the on-site point of contact for the Project Coordinator and USEPA RPM. The Project Superintendent will ensure the segregation effort is performed in accordance with the specific requirements of the contract and the RAWP.

Certified Health Physicist (Safety and Ecology Corporation)

The Certified Health Physicist responsible for the technical supervision of the radiation technicians assigned to this project is Mr. Andrew J. Lombardo, CHP, SEC, Pittsburgh, Pennsylvania. The Certified Health Physicist, working from Pittsburgh, Pennsylvania, will monitor the technical efforts of the on-site radiation technicians to ensure the proper screening/release of transport vehicles and the radiological survey of Dickson Warehouse is performed in accordance with the USEPA-approved methodical screening process. The Certified Health Physicist will report to the Project Manager – Soil Loadout and Building Decontamination as a technical resource, as needed. The on-site radiation technicians will report directly to the Project Superintendent – Soil Loadout and Building Decontamination.



URS

PITTSBURGH, PENNSYLVANIA

REMEDIAL ACTION WORK PLAN
PROJECT ORGANIZATION CHART

Li TUNGSTEN PROPERTY SUPERFUND SITE GLEN COVE, NY

CLIENT: ?????		JOB NUMBER: 41785922	
SCALE: AS SHOWN	FIGURE NUMBER 2		REV 0

FILE: \LITUNGSTEN\PROJ-ORG

01 01 01 02 00 07 0K 0G

4.0 Site Management Plan

The Site Management Plan has been written to provide detailed procedures and protocols for the management and implementation of site operations during the Remedial Action. The plan presented below addresses the operational elements identified in the Judgment, and several additional elements requiring specific accommodation. Work activities include the following:

- Mobilization
- Soil Loadout
- RCRA Soil Stabilization
- Building Decontamination
- Survey of Warehouse

4.1 Mobilization

URS/SEC will utilize a Site Supervisor, two equipment operators, and a radiological technician for loadout activities. This personnel is already at Parcel A performing the dredge spoils segregation project. Equipment, such as, a skidsteer will be mobilized to the site. URS/SEC will utilize the loader currently being used on the dredge spoils project for loading contaminated soil. URS/SEC's trailer, trash dumpster, and portable toilet will be remain at their current location on Parcel A.

The air monitoring instruments URS/SEC is currently using on the dredge spoils project will be utilized for the Dickson Warehouse loadout and decontamination. Three perimeter stationary air-monitoring (dust) stations will be utilized. One will be placed upwind, one downwind and the last station will be placed where needed to accurately evaluate dust migration. Two "mobile" dust-monitoring units will be used in the work area on an as needed basis. High volume air sampling of radioactive particulates may also be performed to evaluate potential airborne particulates in work areas.

In accordance with 29 CFR 1910.120, air monitoring will be used to identify and quantify airborne levels of total particulates in order to determine the appropriate levels of protection needed on site. Routine personal air monitoring will be used to document that respiratory protection must be used or will not be required for those workers with the highest potential for exposure.

Monitoring for total particulates will be conducted at the work area initially for a period of two consecutive days to determine the airborne concentrations to which employees will be exposed. If initial monitoring reveals exposure below pre-established level, monitoring will be reduced and/or stopped based upon the recommendation of URS' Regional HSE. During personal sampling, data will be collected at a rate of one worker subject to the highest exposure per day for an entire 8-or 9-hour work period.

Personal sampling results shall be provided to the appropriate personnel in accordance with URS standard operating procedures. Air monitoring equipment will be calibrated and maintained in accordance with manufacturers' specifications. Should personal sampling results indicate higher levels of particulates than anticipated, the entire site's personal air monitoring program will be re-evaluated to determine if any these levels necessitate a revision of the respiratory protection plan contained in the site-specific health and safety plan.

The following table provides the action level for the contaminants associated with the non-radiological soil stockpiles located in the Dickson Warehouse.

Chemical of Concern	**Detected Soil; Concentration Mg/kg**	**Conversion mgCOC/ mg soil**	**COC OSHA PEL mg/m³**	**Real Time Exposure mg/m³**	**Safety Factor (%)**	**Action Level mg/m³**
Total Dust			5.0		1	5.0
Arsenic	14,000	0.014	0.01	1.0	50%	0.36
Lead	110,000	0.11	0.05	0.5	50%	0.23
PCB	210	0.00021	1.00	4,762	50%	2,381

Based on the table provided above, during loadout of the PCB stockpile, URS' action level for upgrading to a respirator defaults to 5.0 mg/m³. During activities associated with the RCRA soil stockpile, the action level to upgrade to a respirator is 0.23 mg/m³.

The following table provides action levels for the radionuclides of concern located in the Dickson Warehouse.

Radionuclide	Record Exposure Threshold (pCi/liter)	Respirator Threshold (pCi/liter)
Ra-228	5.00E-02	5.00E-01
Th-230	3.00E-04	3.00E-03
Ra-226	3.00E-02	3.00E-01
Th-232	5.00E-05	5.00E-04

4.2 Soil Loadout

URS/SEC will begin contaminated soil loadout by removing the PCB soil stockpile, followed by the loadout of radiologically contaminated soil. This sequencing of removal allows URS/SEC to utilize the space available inside the Dickson Warehouse for loadout operations as well as the stabilization and stockpiling of the RCRA contaminated soil. Prior to loadout of the radiologically contaminated soil, the

South parcel C

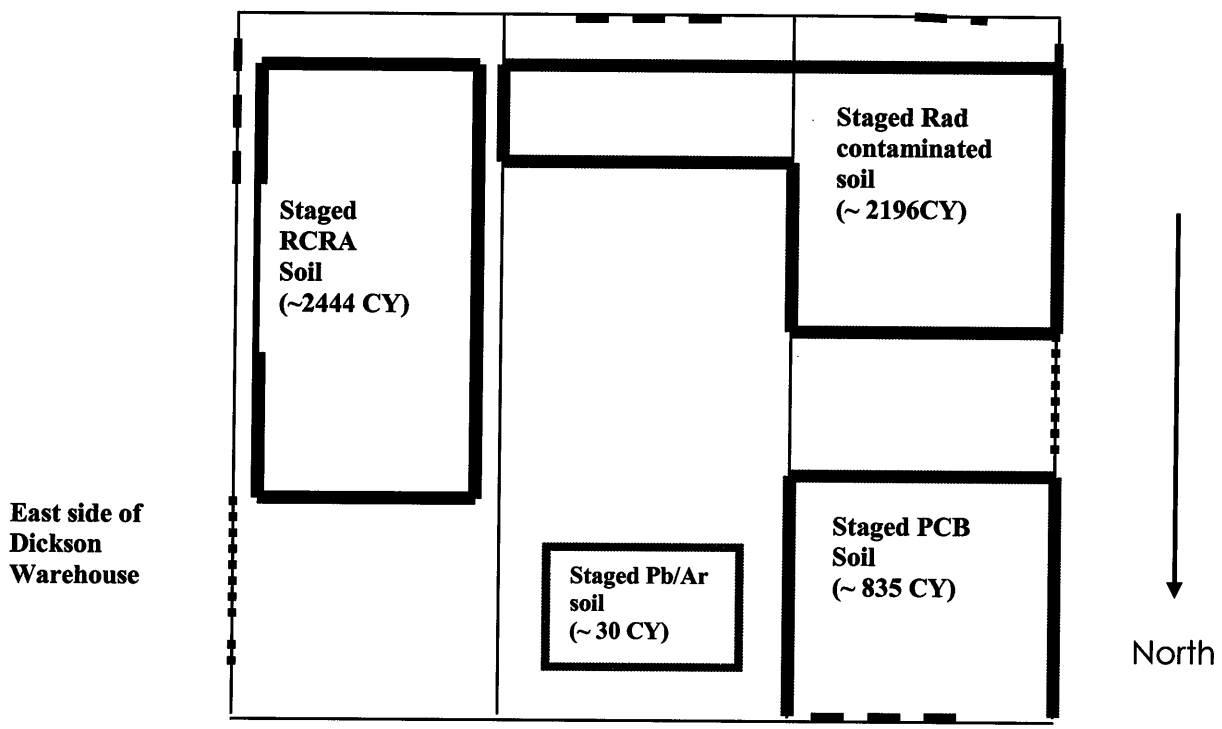


Figure 3 - Dickson Warehouse Plan View

radiological material from the dredge spoils segregation project, which totals less than (1) 55-gallon drum, will be uniformly blended in utilizing an excavator. The radiological material will be spread on the surface of the stockpile and the stockpile "turned over" to blend the material into the stockpile.

URS/SEC will use the rubber-tired loader to load contaminated soil into lined tri-axle trucks. The skidsteer will be utilized to remove any residual material that the larger loader cannot. The skidsteer operation will be followed by minimal hand shoveling to complete the loading task.

During shipping, URS/SEC will fill in the shipping weights on the shipping documents signed by TDY and document each shipment in a shipping log. URS/SEC will use a local truck scale owned by the City of Glen Cove to weigh trucks to meet DOT weight limits and for shipping document accuracy. The first two or three trucks will be used to determine how many loader buckets will be required to fill the trucks sufficiently within legal limits. The appropriate bucket count will then be used to fill the trucks prior to sending the trucks off-site to the scale for weighing. Adjustments will be made in the bucket count based on ongoing analysis of the off-site scale tickets. The material in the Dickson Warehouse appears to be dry and homogeneous enough to utilize this method of loading.

4.3 RCRA Soil Stabilization

Following removal of the PCB contaminated soil, two discrete destructive (chip) samples will be collected from the concrete pad within the footprint of the PCB stockpile. These samples will be analyzed for PCBs. URS/SEC will broom sweep the area and lay down polyethylene sheeting prior to using the area to begin stockpiling stabilized RCRA soil.

A portion of the area currently occupied by the radiologically contaminated soil will also be used for this purpose. Prior to stockpiling stabilized RCRA soil, a preliminary radiological survey will be performed to assure completed removal of contaminated material. If an area of elevated activity is identified, that area will be decontaminated to allow for stockpiling in that area or the area will be properly marked and roped off until decontamination procedures are performed. URS/SEC will lay down polyethylene sheeting prior to using the area to begin stockpiling stabilized RCRA soil.

URS/SEC will utilize Calciment® in one ton super sacks to stabilize the lead contaminated soil (RCRA soil). Calciment® raises the pH of the RCRA soil to approximately 10 to 10.5 to render the lead insoluble and then stabilizes the lead by the pozzolanic process, whereby calcium-silicate-hydrate binds the lead cementitiously. This process has been specified as the "Best Demonstratable Available Technology" (BDAT) for treating heavy metal waste as required by the RCRA Land Disposal Ban. Based upon existing total and TCLP lead data, a recipe of Calciment® at a rate of 5% by weight is expected to

be sufficient to stabilize the lead to the Universal Treatment Standard (UTS) as an Underlying Hazardous Constituent (UHC) of 0.75 mg/l TCLP for lead, thereby allowing disposal of the soil at a Subtitle D landfill.

A treatability study will be conducted on 500 cubic yards of RCRA soil laid out in a 6-inch lift. The footprint of the lift area will be measured and recorded to track the volume of material being stabilized. A total of thirty (30) discrete grab samples will be collected in a triangular grid from the surface of the stockpile to be combined into three composite samples (1 discrete grab sample per 900 square feet of lift). The samples will be analyzed for total and TCLP lead to determine the pre-treatment levels. The Calciment® will be spread on the surface of the lift utilizing the loader and/or excavator. The volume of material being stabilized is a function of the lift's surface area and the depth of 6-inches. Once the Calciment® is spread over the surface area of the stockpile, the Calciment® will be tilled into the soil using a skidsteer equipped with a tiller attachment. The lift will be visually inspected to confirm that the soil and Calciment® has been thoroughly mixed. This reaction will take approximately 5 minutes to complete at which time samples may be collected. Once thoroughly mixed, thirty (30) discrete grab samples (based on a sample per 900 square feet) will be collected in a triangular grid from the surface of the stockpile to be combined into three composite samples. The samples will be analyzed for total and TCLP lead. The TCLP lead results will be compared to the treatment standard of the UTS as a UHC of 0.75 mg/l TCLP for lead to determine if the recipe is adequate.

If the analytical results of the treatability study material does not meet the treatment standard, the recipe will be adjusted, additional Calciment® spread and tilled in and the surface area resampled. Once the TCLP results meet the treatment standard, the material will stockpiled and sampled for waste disposal profiling.

Once the treatability study is completed, the remaining material will be treated in 6-inch lifts. The RCRA stockpile will be spread over the Dickson Warehouse floor using a small dozer in 6-inch lifts. The Calciment® will be spread on the surface of the lift utilizing the loader and/or excavator at a volume determined by the treatability study. Once the Calciment® is spread over the surface area of the lift, the Calciment® will be tilled into the soil using a skidsteer equipped with a tiller attachment. Lifts of material will be stabilized until a 500 cubic yard stockpile is produced. Ten (10) discrete grab samples will be collected in a triangular grid from the surface of the 500 cubic yard stockpile to be combined into one composite sample. The sample will be analyzed for total and TCLP lead. The TCLP lead results will be compared to confirm that the treatment standard of the UTS as a UHC of 0.75 mg/l TCLP for lead has been met. If the analytical results of the stabilized material does not meet the treatment standard,

additional Calciment® spread and tilled in and the surface area resampled. Once the TCLP results meet the treatment standard, the material will stockpiled and sampled for waste disposal profiling.

The stabilization process will continue in the same manner until the entire RCRA contaminated soil stockpile has been stabilized and placed into 500 cubic yard stockpiles of stabilized material.

4.4 Demobilization/Remobilization

Pending acceptance of the stabilized RCRA soils at a Subtitle D landfill, equipment and personnel will be demobilized from the site. Equipment utilized to perform the soil loadout and stabilization operations will be decontaminated and demobilized from the site. The support area facilities, i.e. office trailer, trash bin, portajohns, etc. will remain on site.

Equipment and hand tools will be surveyed for residual radioactivity levels relative to release from the site. At a minimum, portions of the equipment that have come into contact with contaminated materials (i.e., loader buckets, rubber tires, etc.) will be surveyed with appropriate instrumentation at 100 percent coverage for total (fixed plus removable) contamination. Removable contamination levels will be assessed by collecting filter paper samples (swipes) of 100 cm^2 of surface area. Other suspect areas of the heavy equipment such as the cab, steps, mud flaps, and axles of the heavy equipment will also be surveyed for fixed and removable contamination. Hand tools will be surveyed at 100 percent coverage for total contamination (as appropriate) and swipe samples for removable contamination. The criteria and guidance of Regulatory Guide 1.86, as incorporated by Nuclear Regulatory Commission Policy and Guidance Directive FC 83-23 will be used.

Once TDY and URS/SEC has received approval and acceptance of the treated RCRA soil from the disposal facility, mobilization procedures will commence. In preparation of loadout of treated RCRA soil, decontamination, and radiological survey procedures, a supervisor, operator, two laborers, and two radiological technicians will be mobilized to the site to assist in that operation. A rubber-tired loader to load soil and two boomlifts that will be used to access elevated areas during decontamination procedures and to perform final status survey measurements will be mobilized to the site.

4.5 Soils Loadout

URS/SEC will use the same soil loading procedures utilized for the loadout of PCB and radiologically contaminated soil for the treated RCRA and remaining metals soil loadout operation.

Upon completion of the loadout operation, the footprint of the RCRA soils stockpile will be broom swept and the area sampled. Four discrete concrete chip samples will be collected and analyzed for Total Lead.

4.6 Dickson Warehouse Decontamination and Survey

URS/SEC will use the two boom lifts to access the interior elevated areas of the Dickson Warehouse. HEPA vacuums will be used to remove any dirt and dust that is adhered to the interior surfaces. Vacuuming will be performed from the top of the structure concluding with the cleaning of the concrete floor. URS/SEC has anticipated a one pass cleaning procedure to accomplish the "free" unrestricted release criteria established for the site. An initial radiological scan will be performed to evaluate the success of the decontamination procedures prior to proceeding to the Final Status Survey.

Based on analytical results for the PCB and Total Lead samples, the floor area of these two locations may require additional decontamination and/or remediation activities to be performed. Decontamination/remediation efforts may range from power washing to scabbling/scarifying the floor area. Decontamination efforts will be determined by PCB and Total Lead levels of 1 mg/kg and 400 mg/kg, respectively.

URS/SEC, during equipment decontamination activities will collect the water and pump it through a multi-media filter and/or bag filter prior to discharge into a staged frac tank. The water will then be sample per USEPA requirements. Once analysis is received, URS/SEC will submit the analytical results to the USEPA for approval to discharge. After discharge, the tank will be cleaned and demobed form the site.

4.7 Dickson Warehouse Final Status Survey for Unrestricted Release

A final status survey of the structural surfaces of the Dickson Warehouse (interior and exterior) will be performed. Compliance with acceptance criteria established for the site (surface contamination limits of Regulatory Guide 1.86, as incorporated by Nuclear Regulatory Commission Policy and Guidance Directive FC 83-23) will be demonstrated using the guidance of the Multi-Agency Radiological Site Survey and Investigation Manual (MARSSIM) (EPA 402-R-97-016). Based on the radionuclides of concern for the site (Th-232, Th-230, Ra-226 and Ra-228) the applicable total and removable alpha and beta acceptance criteria are provided in the following table.

Radionuclide	Total Contamination ($dpm/100cm^2$)	Max Total Contamination ($dpm/100cm^2$)	Removable Contamination ($dpm/100cm^2$)
Alpha (Ra-226, Ra-228 and Th-230)	100	300	20
Beta (Th-232 and progeny)	1,000	3,000	200

URS/SEC will use large area, gas proportional detectors in conjunction with a Trimble 5600 Total Station to scan the open surfaces of the floor and walls below 2-meters from the floor, for gross alpha and gross beta activity. The Trimble unit will electronically data log radiological and geospatial locations simultaneously at one second intervals. Elevated areas will be identified and remediated and/or evaluated for compliance. Static counts for total contamination determination at equal distant sample point locations will be made with hand held gas proportional detectors. A smear sample of 100 cm^2 of surface area will also be taken at each equal distant sample location. Smears will be counted onsite for removable alpha and removable beta contamination. Ten percent of the smears will be forwarded to an offsite lab for the same analyses. A detailed discussion follows:

(1) The surfaces of the warehouse (floors and walls) will be cleaned, e.g., power washed, and dried prior to performing final status surveys. All of the current materials and equipment will be removed prior to beginning final surveys.

(2) The floor of the warehouse and the walls up to approximately 2-meters above the floor surface will be surveyed as a MARSSIM Class 1 survey unit(s). The walls above 2-meters and the ceiling will be surveyed as a MARSSIM Class 2 survey unit and the exterior surface of the warehouse will be surveyed as a MARSSIM Class 3 survey unit.

(3) Each survey unit will be surveyed at the required coverage per survey unit classification, e.g., Class 1 survey units at 100% coverage, Class 2 survey units at 10% coverage and Class 3 survey units at the judgment of the site health physics lead. The surveys will be designed to detect elevated areas of gross alpha and gross beta total surface contamination. (Total contamination is equal to fixed plus removable surface contamination.) Surveys of gross alpha and gross beta total contamination are measured in units of counts per minute (cpm). The cpm results are converted to units of disintegrations per minute per 100 square centimeters of surface area (dpm/100cm^2) by correcting the cpm result for the alpha or beta detector efficiency and the active area of the detector.

(4) After any elevated areas identified by scans have been remediated and rescanned static counts to determine total contamination and smear samples for the determination of removable contamination will be performed at the minimum number of sample points per survey unit. The survey points will be located at equal distant locations within a survey unit using a random start point triangular grid.

(5) The scan Minimum Detectable Concentrations (MDC) in units of dpm/100cm^2 will be calculated based on the gross cpm background for the measurement of alpha and beta total contamination. The calculations will be made using the formulas provided in Chapter 6 of MARSSIM.

(6) All survey units will be evaluated to determine whether the average residual radioactivity concentration in the survey unit as a whole is below the total and removable surface contamination acceptance criterion. The final status survey (FSS) will use both systematic grid sampling to determine this average total and removable contamination in a survey unit in conjunction with gross alpha and beta scans to identify elevated areas of residual radioactivity. At least the minimum number of sample points (N/2) will be taken in each survey unit. Since the radionuclides of remediation interest at the site also occur naturally in background, survey unit FSS data will be compared to data from a reference area under what is known as a "two-sample test," the WRS Test. When using the WRS Test, the minimum number of sample points (N/2) is the number of sample points required in the survey unit and in the reference background area. Hence "N" is the total number of sample points required to complete the WRS Test. Paramount to determining the minimum number of sample points is the determination of the relative shift, delta over sigma (Δ/σ). Delta is equal to the total contamination acceptance criteria minus the lower-bound gray region (LBGR) value. The LBGR value is arbitrarily set at one-half the acceptance criteria value to start the determination. Sigma is an estimate of the variability in a set of sample analysis results from a survey unit.

The estimate of sigma used is based on the trial measurement of alpha and beta total contamination in the Dickson Warehouse (4.58 and 8.66 respectively). For alpha total contamination Δ is equal to 100 - 50, or 50. Delta divided by the sigma of 4.58 results in a relative shift of 11 and the number of samples will be calculated using the following formula or looked up in Table 5.3 of MARSSIM:

$$N/2 = \frac{(Z_{1-\alpha} + Z_{1-\beta})^2}{3(P_r - 0.5)^2}$$

where:

$Z_{1-\alpha}$ = percentile represented by selected value of α, Table 5.2 of MARSSIM,
$Z_{1-\beta}$ = percentile represented by selected value of β, Table 5.2 of MARSSIM, and
P_r = value obtained from Table 5.1 of MARSSIM.

Based on a relative shift of 22, the number of sample points is 9. Likewise, for total beta contamination the delta is equal to 500 divided by sigma of 8.66 results in a relative shift of 58 which also equates to the minimum number of sample points of 9:

Dickson Warehouse Minimum FSS Sample Points

Survey Unit Area (m^2)	Land Area Classification	DQO		Sample Points (N/2)
		Type I Error (α) Control	Type II Error (β) Control	
100	1	0.05	0.05	9
100 to 1,000	2	0.05	0.05	9
1,000 and above	3	0.05	0.05	9

The number of sample points in the above table includes a factor to increase the number of required sample points by 20 percent, as recommended by MARSSIM, to allow for lost or unusable data.

(7) The minimum number of sample points required to determine total and removable contamination in the survey unit is 9 whenever the scan MDC value is less than the applicable acceptance criteria. The minimum number of samples will be re-calculated based on the scan MDC, using MARSSIM guidance when the scan MDC is greater than the appropriate applicable acceptance criteria. The increased number of sample points will be calculated based on elevated measurement comparisons and area factors as detailed in MARSSIM. The required number of surface sample points will then be located using a random-start systematic triangular grid.

(8) At each sample point a static count to determine total alpha and total beta contamination and a smear sample for the determination of removable alpha and removable beta contamination will be performed. Smear samples will be taken with standard 47 mm filters and will cover approximately 100 cm^2 of surface area. The results of the static counts of total contamination and the onsite count of smear samples (for removable contamination) will be converted to units of dpm/100cm^2 using the formulas provided in MARSSIM. MDC values and standard 2 sigma errors will also be calculated and reported for each measurement of total and removable contamination.

(9) Ten percent of the smear samples counted onsite will be forwarded to a qualified laboratory for the determination of removable alpha and beta contamination as a quality control measure.

Additional details regarding instrumentation and sampling and analysis are presented in Appendix A, Sampling and Analysis Plan. Additional sampling quality details are presented in Appendix C, Quality

Assurance Project Plan. Additional details regarding the pre-transportation release of trucks are presented in Appendix D, Truck Pre-Transportation Release Plan.

4.8 Demobilization

Upon completion of the Dickson Warehouse loadout and decontamination, the equipment used on the project will be decontaminated and demobilized per the procedures previously discussed.

4.9 Support Facilities

Support facilities currently established at Parcel A for the dredge spoils segregation operation will be used for the soil loadout and building decontamination project. The facilities will include an office trailer with appropriate phone and electric service, portable toilets, and trash bin.

4.10 Site Security

The Project Superintendent will perform site security inspections once a week to confirm site security is being maintained. The inspections will consist of visual observations of the site security features currently in place. The entire length of the perimeter fencing will be evaluated for breaches that may allow unauthorized individuals to enter the project area. Also, access gates will be inspected to confirm proper operation and usage. Access gate locks will be inspected to determine if replacements may be required. Deficiencies identified during the inspections will be corrected immediately with the necessary repairs or upgrades.

4.11 Coordination with Local Authorities

URS/SEC will contact the local authorities (City of Glen Cove) to discuss and coordinate the established contingency planning and potential traffic issues. The local fire and police departments, in addition to the nearest hospital, will be informed of the general nature of anticipated site operations and the established contingency planning. These contacts will provide valuable information to the entities involved as to the potential emergencies that may arise and the plan of action proposed. Potential concerns regarding traffic management will be addressed with the police department at that time and a plan of action will be developed, documented, and implemented, as needed.

4.12 Access

Access to the site will be through the gates currently located along Dickson Avenue. Site visitors and nonauthorized personnel will be required to check in with the site trailer and sign in on the site access log to record the identity of the individual along with arrival and departure times. No one will be granted access to the site unless authorized by the Project Superintendent or his designee. Individuals who do not

possess the required 40-hour HAZWOPER training, with refresher certification, will not be allowed into the designated exclusion zone. During periods of site inactivity, which may occur between the material segregation and material removal phases of the project, the site will be locked to prevent unauthorized access.

4.13 Project Reporting

During the execution of the project, monthly reports will be completed per the Judgment. Four copies of the monthly report will be sent to the USEPA and three copies sent to the State of New York by the 10th of the following month. The monthly progress reports will be prepared describing:

- Actions taken for compliance of the Consent Judgment in the previous month.
- Date of commencement and completion for RAWP schedule tasks in the previous month.
- Summary of sampling and test results in the previous month including all data.
- Identification of all plans and deliverables completed and submitted in the previous month.
- Remedial actions anticipated for the next four weeks including a schedule.
- Percentage of completion, unresolved delays encountered or anticipated, and the efforts to mitigate the delays.
- Modifications to the work plans and schedule that have been proposed and/or approved by the USEPA, and
- Description of activities to support the Community Relations Plan during the previous month and planned for the next six weeks.

At the completion of the project, a Remedial Action Report will be completed per the Judgment. The report will be submitted within 60-days of the final inspection. The Remedial Action Report will include the following:

- Documentation verifying the performance standards of the 1999 ROD have been met
- Synopsis of the work performed under the Judgment
- Description of USEPA approved modifications to the RAWP
- Listing of the quantities and types of waste materials removed from the site
- Presentation of the analytical results of all sampling and analyses performed, including QA/QC data and chain-of-custody records
- Data validation documentation
- Appendices containing all relevant documentation generated during the work
- Description of punch list items from the Pre-Final Inspection and the resolution of the items

- Respondents' certification statement

The Remedial Action Report will be signed and stamped by a professional engineer licensed in the State of New York.

5.0 Remedial Waste Management Plan

5.1 Polychlorinated Biphenyl Contaminated Soil

PCB soil will be loaded into lined tri-axle dump trucks utilizing a rubber-tired loader. The truckloads will be tarped once loading operations have been completed. The trucks will proceed to an off-site truck scale owned by the City of Glen Cove for weighing. Shipping documents will be completed and the trucks released for transport to the transfer facility operated by MHF Logistical Solutions located in North Bergen, NJ.

At the transfer facility, the trucks will dump their load into staged gondola railcars. The railcar capacity is approximately five truck loads of material. Once filled, the gondola cars of PCB contaminated soil will be shipped to Wayne Disposal operated by EQ Company for disposal.

Table 5-1
Reportable Quantities

Contaminant	RQ	Average Concentration	Est. Concentrations RQ Exceedence Tri-Axle Truck
PCBs	1 lb	56 mg/kg	2.44 lbs

The type of shipping container for all of the material stored inside the Dickson Warehouse material will be tri-axle trucks. URS anticipates the average weight of a shipment in a loaded truck is approximately 43,600 pounds. Based on a density of 1.52 ton per cubic yard, the average shipment in the tri-axle truck should amount to approximately 14.3 cubic yards of material.

A Uniform Hazardous Waste Manifest will be completed prior to shipment. The proper shipping name will be completed on the manifest as Waste Polychlorinated Biphenyls, Solid, UN3432, 9, PG III.

5.2 Radiologically Contaminated Soil

The radiologically contaminated soil will be managed in a similar manner as described in Section 5.1 – Polychlorinated Biphenyl Contaminated Soil. However prior to leaving the Dickson Warehouse, the exterior of the truck will be surveyed for radiation activity. After survey has been completed, the trucks will be released to the truck scale for weighing.

Classification, under requirements of 49 Code of Federal Regulations (CFR) of loaded trucks for Dickson Warehouse material requires radioisotope activity levels and the weight of the shipment. The data will be collected during the loadout and survey procedures. Using the weight of the tri-axle trucks, a calculation

will be performed to classify the shipment as a Class 7, Class 9, or other shipment. The classification of the shipment is determined on the weight of the shipment and the concentrations of the metals and radionulcides in the shipment.

A Class 7 shipment of soil would be for material that exceeds the activity concentrations listed in 49 CFR 173.436 for the radionuclides present. The calculation of activity concentrations of the shipment is a sum of the fractions calculation for the radionuclides present in the shipment. Based on the average concentrations of radionuclides present within the stockpile and the weight of the shipment, most if not all of the shipments from the Dickson Warehouse will DOT Class 9.

Table 5-2
Reportable Quantities

Contaminant	RQ	Average Concentration	Est. Concentrations RQ Exceedence 109 ton Gondola
Radium-226	0.1 Ci	10.0 pCi/g	1010 pCi/g
Radium-228	0.1 Ci	28.0 pCi/g	1010 pCi/g
Thorium-230	0.01 Ci	10.0 pCi/g	101 pCi/g
Thorium-232	0.001 Ci	28.0 pCi/g	10.1 pCi/g
Lead	10 lbs.	292 mg/kg	46 mg/kg
Arsenic	1 lb	260 mg/kg	4.6 mg/kg

[1]These values have been estimated using analytical results of samples collected during the RI. Only data points within the expected areas of removal and from material staged in the Dickson Warehouse were included.
[2]The method to determine the RQs for mixtures or solutions of radionuclides can be found in paragraph 7 of the note preceding TABLE 1 of 49 CFR 172.101 Appendix A. RQs for the following radionuclide mixtures are provided: radium-226 in secular equilibrium with its daughters (0.053curie): and natural thorium in secular equilibrium with its daughters (0.011 curie)
†Average and maximum concentrations for radium-228 and thorium-230 are estimated values and assumes secular equilibrium with its respective decay chain.

A bill of lading will be used to ship the radiological material off site. The DOT shipping name will be "Soil, DOT Class 9 (lead and arsenic), Not DOT Class 7 per exemption in 49 CFR 173.401(b)(4)". The use of Uniform Low Level Radioactive Waste Manifests is not expected. If a NRC licensed facility is chosen as a disposal site, TDY shall utilize the paperwork required by the facility.

The trucks will transport the material to a transfer facility operated by MHF Logistical Solutions located in North Bergen, NJ. The gondola cars will be used to transport the radiologically contaminated soil to US Ecology Idaho operated by American Ecology Corporation for disposal.

5.3 Treated RCRA/Non-Hazardous Soil

The treated RCRA and non-hazardous soil will be managed on site in a similar manner as described in Section 5.1 – Polychlorinated Biphenyl Contaminated Soil. The trucks will transport the material to a landfill operated by Waste Management located in Morrisville, Pennsylvania for disposal.

A Non-Hazardous Waste Manifest will be completed prior to shipment of the material.

5.4 Shipment Notification

TDY will complete the advanced notification to the appropriate disposal facilities. TDY will also notify the appropriate receiving state authorities as required.

5.5 Equipment Decontamination

When the loadout of soils and/or building decontamination activities are complete, potentially contaminated equipment (equipment having contact with affected material) will be mechanically decontaminated in the contaminant reduction zone. Material scraped, brushed, or otherwise removed from the equipment, if contaminated, will be collected in a drum(s) or other appropriate container depending on the volume of material. Personal protective equipment and other potentially effected disposable supplies will be stored in drums on site and removed during waste management operations.

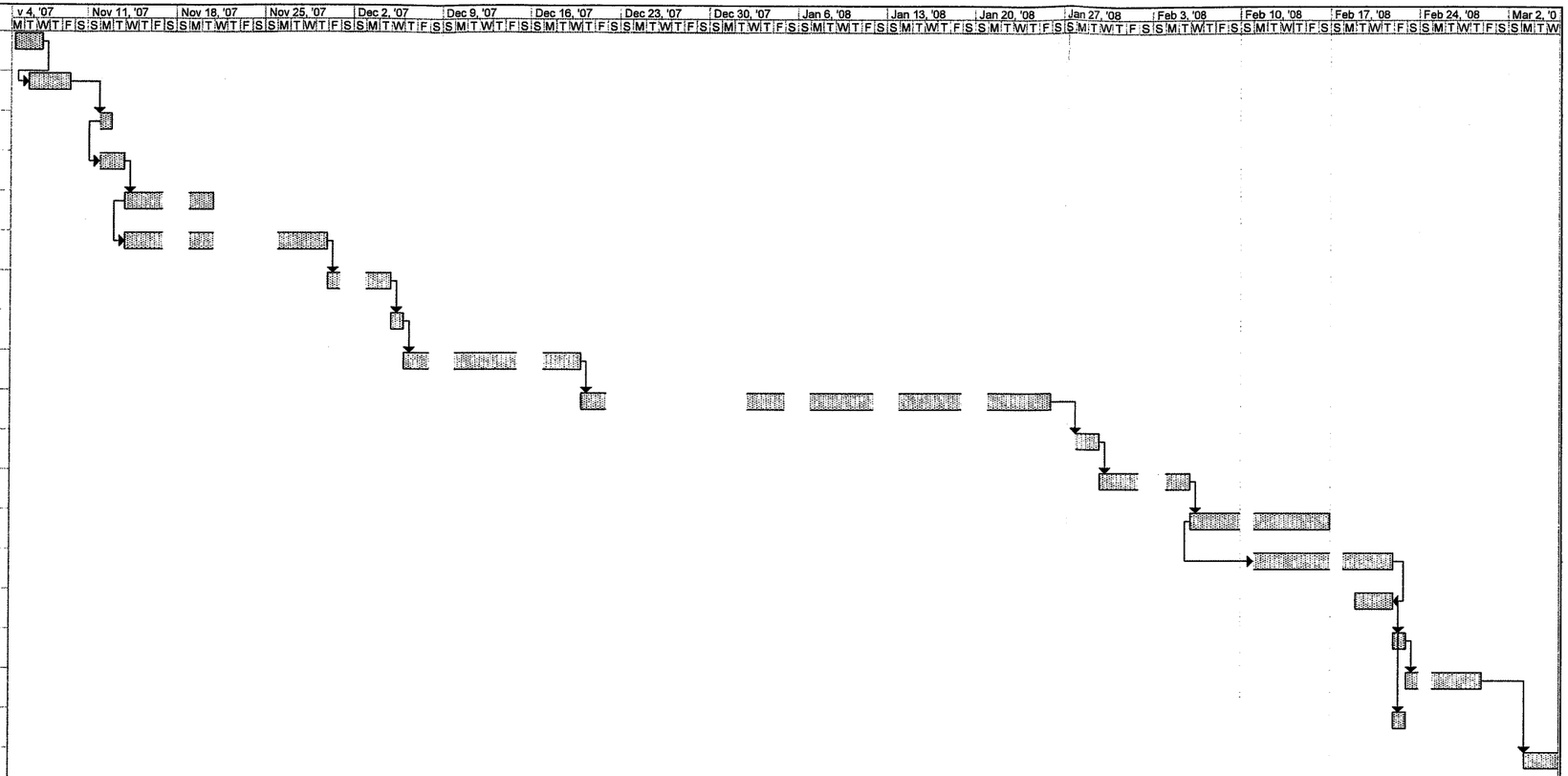
After each piece of equipment is decontaminated, each piece will be surveyed for residual radioactivity in accordance with the unrestricted release protocol for the site. At a minimum, portions of the equipment which have contacted contaminated materials (i.e., excavator and loader buckets, dozer blades, rubber tires, tracks) will be surveyed with a gas proportional detector or equivalent at 100-percent coverage for total (fixed plus removable) contamination. Removable contamination levels will be assessed by collecting filter paper samples (swipes) representing every 2 square meters of surface area. The swipes will be analyzed with an on-site smear counter. Hand tools will be surveyed at 100-percent coverage for fixed contamination (as appropriate) and swipe samples taken for removable contamination. Similar equipment decontamination procedures will be implemented during the material waste management operations that follow the soil loadout and building decontamination activities.

Pressure washing of the equipment will be performed as necessary to remove any contamination. The decon water will be pumped through a multi-media filter and/or bag filter prior to discharge into a staged frac tank. The water will then be sample per USEPA requirements. Once analysis is received, URS/SEC will submit the analytical results to the USEPA for approval to discharge.

6.0 Project Schedule

The current project schedule is presented in Figure 4. The schedule will be revised, as necessary, during the course of the project to reflect current project conditions and circumstances. Minor modifications to the schedule are not considered by TDY to be cause for notification of delay.

ID	Task Name	Duration	Start	Finish	Predecessors
1	Work Plan Development	2 days	Mon 11/5/07	Wed 11/7/07	
2	EPA Review	3 days	Tue 11/6/07	Fri 11/9/07	1FS-1 day
3	Mobilization of Additional Equipment	1 day	Mon 11/12/07	Mon 11/12/07	2
4	Loadout of PCB Contaminated Soils 835 Cyds	2 days	Mon 11/12/07	Tue 11/13/07	3SS
5	Loadout Radiological Soils 2,196 Cyds	5 days	Wed 11/14/07	Tue 11/20/07	4
6	Stabilization of RCRA Soil 2,444 Cyds	9 days	Wed 11/14/07	Thu 11/29/07	5SS
7	Decontamination of Equipment	3 days	Fri 11/30/07	Tue 12/4/07	6
8	Demobilization	1 day	Wed 12/5/07	Wed 12/5/07	7
9	Soil Characterization Analysis	10 days	Thu 12/6/07	Wed 12/19/07	8
10	GROWS Landfill Acceptance	20 days	Thu 12/20/07	Fri 1/25/08	9
11	Re-mobilization (travel + equipment)	2 days	Mon 1/28/08	Tue 1/29/08	10
12	Loadout of Stabilized Soil	5 days	Wed 1/30/08	Tue 2/5/08	11
13	Warehouse Decontamination	10 days	Wed 2/6/08	Sat 2/16/08	12
14	Radiological Survey	10 days	Mon 2/11/08	Thu 2/21/08	13SS+4 days
15	Equipment Decontamination	3 days	Tue 2/19/08	Thu 2/21/08	14FF
16	Water Sample for Disposal/ Discharge	1 day	Fri 2/22/08	Fri 2/22/08	15
17	Sample TAT	5 days	Sat 2/23/08	Thu 2/28/08	16
18	Demobilization	1 day	Fri 2/22/08	Fri 2/22/08	15
19	Frac Tank Discharge Cleaning	3 days	Mon 3/3/08	Thu 3/6/08	17FS+1 day



Project: Li Tungsten Dickson Loadout
Date: Wed 10/31/07

Task | Split | Progress | Milestone | Summary | Project Summary | External Tasks | External Milestone | Deadline

Attachment E

RCRA Soil Stabilization Plan

February 2008

RCRA Soil Stabilization Plan
Dickson Warehouse
Li Tungsten Superfund Site
Glen Cove, New York

Revision 1

December 2007

Date: 12-3-07

Jeffrey J. Calarie
Senior Project Manager
URS Corporation

Prepared By:

URS Corporation
Foster Plaza 4
501 Holiday Drive, Suite 300
Pittsburgh, Pennsylvania 15220

RCRA Soil Stabilization Plan
Table of Contents

RCRA Soil Stabilization Plan
Dickson Warehouse
Li Tungsten Superfund Site
Glen Cove, New York

1.0 Introduction

On behalf of TDY Holdings, LLC (TDY) and in conformance with the 1999 Record of Decision, Li Tungsten Corporation Superfund Site, Nassau County, New York (1999 ROD), and the Consent Judgment, US v. AGI-VR/Wesson et al. of 2007 (Judgment), URS Corporation (URS) has prepared this RCRA Soil Stabilization Plan (RSSP). This RSSP includes a detailed description of the soil stabilization activities for implementing the following remedial action scope of work:

- The stabilizing of approximately 1,500 cubic yards of RCRA (lead) staged soils in the Dickson Warehouse on Parcel C of the Li Tungsten Superfund Site to permit disposal into a Subtitle D landfill.

2.0 Site Background

The Li Tungsten Superfund Site is located in the City of Glen Cove, Nassau County, New York, and includes the former Li Tungsten Corporation facility at Herbhill Road and Dickson Lane. As a result of processing of ores at the facility on the Li Tungsten property, and the subsequent disposal of portions of the byproducts of that processing, elevated levels of radiation and certain metals had come to be present at or in the vicinity of the Li Tungsten property. The property is approximately 26 acres.

From April 2006 to August 2007, "ECC" activities based on a remedy selected in the 1999 ROD were performed on Parcels B and C of the Li Tungsten Superfund Site that included the excavation and segregation of contaminated soils. After the "ECC" operation, approximately 2,444 cubic yards of RCRA contaminated soils, 30 cubic yards of metals contaminated soils, 835 cubic yards of PCB contaminated soils, and 2,196 cubic yards of radiological contaminated soil remained stockpiled in the Dickson Warehouse located on Parcel C of the Li Tungsten Superfund Site.

3.0 RCRA Soil Stabilization

URS will utilize Calciment® in one ton super sacks to stabilize the lead contaminated soil (RCRA soil). Based upon the results and findings of the Treatability Study, a recipe of Calciment® at a rate of 7.5% by weight is expected to stabilize the lead to the Universal Treatment Standard (UTS) as an Underlying Hazardous Constituent (UHC) of 0.75 mg/l TCLP for lead, thereby allowing disposal of the soil at a Subtitle D landfill.

A Treatability Study was conducted from November 17 to November 20, 2007 on 500 cubic yards of RCRA soil. During the Treatability Study, Calciment® at a rate of 5.0% by weight was blended into the RCRA soil. Six (6) composite samples were collected and analyzed for TCLP lead. Two (2) of the analytical results (8.7 and 24 mg/l) exceeded the UTS of 0.75 mg/l TCLP for lead. Based on these results, the treatment recipe will be increased to 7.5% by weight. To meet the revised treatment recipe, an additional 2.5% by weight of Calciment® will be added to the 500 cubic yards of RCRA soil treated during the Treatability Study.

The Calciment® will be distributed evenly over a lift of 250 cubic yards using a dozer and excavator. Once the Calciment® is spread over the surface area of the lift, the Calciment® will be tilled into the soil using a dozer. The material will also be blended by "tumbling" the soil/Calciment® mixture using a rubber-tired loader. The lift will be visually inspected to confirm that the soil and Calciment® have been thoroughly mixed. To provide sufficient lighting for the visual inspection, two (2) portable light plants will be erected inside the Dickson Warehouse. URS will mix the material for a longer period of time than that employed during the Treatability Study to insure thorough blending. To complete this portion of the stabilization operation, two (2) 250 cubic yard lifts of treated material from the Treatability Study will be re-treated. Three composite samples comprising of five (5) grab samples each will be collected from each 250 cubic yard batch. The samples will be analyzed for Total and TCLP lead analysis. The material will be placed into 250 cubic yard stockpiles inside the Dickson Warehouse.

Once the Treatability Study soil stabilization is completed, the remaining 1,000 cubic yards of RCRA soil will be treated in 250 cubic yard batches in 6-inch lifts. The RCRA stockpile will be spread over the Dickson Warehouse floor using a small dozer. The Calciment® will be spread on the surface of the lift utilizing the loader and/or excavator at a volume of 7.5% by weight. Once the Calciment® is spread over the surface area of the lift, the Calciment® will be tilled into the soil using a dozer and will also be "tumbled" using a rubber-tired loader. Fifteen (15) discrete grab samples will be collected in a triangular grid from the surface of the lift to be combined into three composite samples. The samples will be

analyzed for total and TCLP lead. The TCLP lead results will be compared to the treatment standard of the UTS as a UHC of 0.75 mg/l TCLP for lead to determine if the treatment is adequate. Each treated lift will be placed into a discrete stockpiled inside the Dickson Warehouse. This operation will be repeated until the entire 1,000 cubic yards of RCRA soil is treated (4 lifts / stockpiles).

If the analytical results do not meet the treatment standard, the recipe will be adjusted, the failed stockpile spread over the floor of the Dickson Warehouse, additional Calciment® spread and tilled in, and the lift resampled and analyzed for TCLP lead.

Access to the site will be through the gates currently located along Dickson Avenue. Site visitors and nonauthorized personnel will be required to check in with the site trailer and sign in on the site access log to record the identity of the individual along with arrival and departure times. No one will be granted access to the site unless authorized by the Project Superintendent or his designee. Individuals who do not possess the required 40-hour HAZWOPER training, with refresher certification, will not be allowed into the designated exclusion zone. During periods of site inactivity, which may occur between the material segregation and material removal phases of the project, the site will be locked to prevent unauthorized access.

Attachment F

Soil Stabilization Sample Results

December 18, 2007

Mr. Jeff Calarie
URS Corporation
Construction Services Division
Foster Plaza 4
501 Holiday Drive, Suite 300
Pittsburgh, PA 15220

Dear Mr. Calarie:

Enclosed are analytical results for samples submitted to Pace Analytical by URS Corporation. The samples were received on December 10, 2007. The results reported in this project meet the requirements as specified in Chapter 5 of the NELAC Standards. Any deviations or discrepancies from the NELAC standards are documented in the case narrative(s) of this report. Parameters printed in italics represent Non-NELAC accredited parameters. Please reference Pace project number 07-9442 when inquiring about this report.

Client Site: LI Tungsten
Client Ref.: 41785922.00003

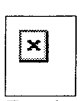
Pace Sample Identification	Client Sample Identification
0712-1720	RL-1
0712-1721	RL-2
0712-1722	RL-3
0712-1723	RL-4
0712-1724	RL-5
0712-1725	RL-6
0712-1726	L-31
0712-1727	L-32
0712-1728	L-33

Pace Sample Identification	Client Sample Identification
0712-1729	L-34
0712-1730	L-36
0712-1731	L-37
0712-1732	L-38
0712-1733	L-39
0712-1734	L-40
0712-1735	L-41
0712-1736	L-42
0712-1737	L-35

General Comments: Cooler temperature 7 ° C upon receipt. Ice was not present.

Please call me if you have any questions regarding the information contained within this report.

Sincerely,



Raelyn E. Sylvester
Project Manager

REC: rec

Enclosures

Page 1 of ____

Mr. Jeff Calarie
URS Corporation
Construction Services Division
Foster Plaza 4
501 Holiday Drive, Suite 300
Pittsburgh, PA 15220

Client Site: LI Tungsten
Client Ref.: 41785922.00003

Lab Project ID: **07-9442**
Lab Sample ID: **0712-1720**
Client Sample ID: RL-1
Sample Matrix: Solid

Date Sampled: 12/03/2007
Date Received: 12/10/2007

Inorganic Extraction

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Percent Solids	% Solids	91	N/A	%	DAB	12/11/2007	N/A	N/A

Metals

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Trace Metals, TCLP, ICP								
Lead	6010B[(1)]	0.23	0.050	mg/l	CS0	12/17/2007	0068691-1	<0.050
Trace Metals, Total, ICP								
Lead	6010B[(1)]	10000	3.8	mg/kg	PMM	12/15/2007	0068513-1	<0.50

[(1)] U.S. Environmental Protection Agency, 1996, Test Methods for Evaluating Solid Waste, SW-846, 3rd ed., Office of Solid Waste and Emergency Response, Washington, DC.

Sample Comments: Results reported in dry weight equivalence.

Mr. Jeff Calarie
URS Corporation
Construction Services Division
Foster Plaza 4
501 Holiday Drive, Suite 300
Pittsburgh, PA 15220

Client Site: LI Tungsten
Client Ref.: 41785922.00003

Lab Project ID: **07-9442**
Lab Sample ID: **0712-1721**
Client Sample ID: RL-2
Sample Matrix: Solid

Date Sampled: 12/03/2007
Date Received: 12/10/2007

Inorganic Extraction

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Percent Solids	% Solids	90	N/A	%	DAB	12/11/2007	N/A	N/A

Metals

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Trace Metals, TCLP, ICP								
Lead	6010B[(1)]	<0.050	0.050	mg/l	CS0	12/17/2007	0068691-1	<0.050
Trace Metals, Total, ICP								
Lead	6010B[(1)]	11000	5.0	mg/kg	PMM	12/15/2007	0068513-1	<0.50

[(1)] U.S. Environmental Protection Agency, 1996, Test Methods for Evaluating Solid Waste, SW-846, 3rd ed., Office of Solid Waste and Emergency Response, Washington, DC.

Sample Comments: Results reported in dry weight equivalence.

Mr. Jeff Calarie
URS Corporation
Construction Services Division
Foster Plaza 4
501 Holiday Drive, Suite 300
Pittsburgh, PA 15220

Client Site: LI Tungsten
Client Ref.: 41785922.00003

Lab Project ID: **07-9442**
Lab Sample ID: **0712-1722**
Client Sample ID: RL-3
Sample Matrix: Solid

Date Sampled: 12/03/2007
Date Received: 12/10/2007

Inorganic Extraction

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Percent Solids	% Solids	91	N/A	%	DAB	12/11/2007	N/A	N/A

Metals

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Trace Metals, TCLP, ICP								
Lead	6010B[(1)]	<0.050	0.050	mg/l	CS0	12/17/2007	0068691-1	<0.050
Trace Metals, Total, ICP								
Lead	6010B[(1)]	4900	4.1	mg/kg	PMM	12/15/2007	0068513-1	<0.50

[(1)] U.S. Environmental Protection Agency, 1996, Test Methods for Evaluating Solid Waste, SW-846, 3rd ed., Office of Solid Waste and Emergency Response, Washington, DC.

Sample Comments: Results reported in dry weight equivalence.

Mr. Jeff Calarie
URS Corporation
Construction Services Division
Foster Plaza 4
501 Holiday Drive, Suite 300
Pittsburgh, PA 15220

Lab Project ID: **07-9442**
Lab Sample ID: **0712-1723**
Client Sample ID: RL-4
Sample Matrix: Solid

Date Sampled: 12/03/2007
Date Received: 12/10/2007

Client Site: LI Tungsten
Client Ref.: 41785922.00003

Inorganic Extraction

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Percent Solids	% Solids	92	N/A	%	DAB	12/11/2007	N/A	N/A

Metals

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Trace Metals, TCLP, ICP								
Lead	6010B[(1)]	<0.050	0.050	mg/l	CS0	12/17/2007	0068691-1	<0.050
Trace Metals, Total, ICP								
Lead	6010B[(1)]	5500	3.6	mg/kg	PMM	12/15/2007	0068513-1	<0.50

[(1)] U.S. Environmental Protection Agency, 1996, Test Methods for Evaluating Solid Waste, SW-846, 3rd ed., Office of Solid Waste and Emergency Response, Washington, DC.

Sample Comments: Results reported in dry weight equivalence.

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Client Site: LI Tungsten
Client Ref.: 41785922.00003

Lab Project ID: **07-9442**
Lab Sample ID: **0712-1724**
Client Sample ID: RL-5
Sample Matrix: Solid

Date Sampled: 12/03/2007
Date Received: 12/10/2007

Inorganic Extraction

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Percent Solids	% Solids	91	N/A	%	DAB	12/11/2007	N/A	N/A

Metals

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Trace Metals, TCLP, ICP								
Lead	6010B[(1)]	<0.050	0.050	mg/l	CS0	12/17/2007	0068691-1	<0.050
Trace Metals, Total, ICP								
Lead	6010B[(1)]	5900	4.3	mg/kg	PMM	12/15/2007	0068513-1	<0.50

(1) U.S. Environmental Protection Agency, 1996, Test Methods for Evaluating Solid Waste, SW-846, 3rd ed., Office of Solid Waste and Emergency Response, Washington, DC.

Sample Comments: Results reported in dry weight equivalence.

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Client Site: LI Tungsten
Client Ref.: 41785922.00003

Lab Project ID: **07-9442**
Lab Sample ID: **0712-1725**
Client Sample ID: RL-6
Sample Matrix: Solid

Date Sampled: 12/03/2007
Date Received: 12/10/2007

Inorganic Extraction

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Percent Solids	% Solids	91	N/A	%	DAB	12/11/2007	N/A	N/A

Metals

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Trace Metals, TCLP, ICP								
Lead	6010B[(1)]	<0.050	0.050	mg/l	CS0	12/17/2007	0068691-1	<0.050
Trace Metals, Total, ICP								
Lead	6010B[(1)]	5400	3.9	mg/kg	PMM	12/15/2007	0068513-1	<0.50

[(1)] U.S. Environmental Protection Agency, 1996, Test Methods for Evaluating Solid Waste, SW-846, 3rd ed., Office of Solid Waste and Emergency Response, Washington, DC.

Sample Comments: Results reported in dry weight equivalence.

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Client Site: LI Tungsten
Client Ref.: 41785922.00003

Lab Project ID: **07-9442**
Lab Sample ID: **0712-1726**
Client Sample ID: L-31
Sample Matrix: Solid

Date Sampled: 12/04/2007
Date Received: 12/10/2007

Inorganic Extraction

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Percent Solids	% Solids	92	N/A	%	DAB	12/11/2007	N/A	N/A

Metals

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Trace Metals, TCLP, ICP								
Lead	6010B(1)	<0.050	0.050	mg/l	CS0	12/17/2007	0068691-1	<0.050
Trace Metals, Total, ICP								
Lead	6010B(1)	3900	3.6	mg/kg	PMM	12/15/2007	0068513-1	<0.50

(1) U.S. Environmental Protection Agency, 1996, Test Methods for Evaluating Solid Waste, SW-846, 3rd ed., Office of Solid Waste and Emergency Response, Washington, DC.

Sample Comments: Results reported in dry weight equivalence.

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Client Site: LI Tungsten
Client Ref.: 41785922.00003

Lab Project ID: **07-9442**
Lab Sample ID: **0712-1727**
Client Sample ID: L-32
Sample Matrix: Solid

Date Sampled: 12/04/2007
Date Received: 12/10/2007

Inorganic Extraction

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Percent Solids	% Solids	91	N/A	%	DAB	12/11/2007	N/A	N/A

Metals

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Trace Metals, TCLP, ICP								
Lead	6010B[1]	<0.050	0.050	mg/l	CS0	12/17/2007	0068691-1	<0.050
Trace Metals, Total, ICP								
Lead	6010B[1]	4200	4.0	mg/kg	PMM	12/15/2007	0068513-1	<0.50

[1] U.S. Environmental Protection Agency, 1996, Test Methods for Evaluating Solid Waste, SW-846, 3rd ed., Office of Solid Waste and Emergency Response, Washington, DC.

Sample Comments: Results reported in dry weight equivalence.

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Client Site: LI Tungsten
Client Ref.: 41785922.00003

Lab Project ID: **07-9442**
Lab Sample ID: **0712-1728**
Client Sample ID: L-33
Sample Matrix: Solid

Date Sampled: 12/04/2007
Date Received: 12/10/2007

Inorganic Extraction

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Percent Solids	% Solids	89	N/A	%	DAB	12/11/2007	N/A	N/A

Metals

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Trace Metals, TCLP, ICP								
Lead	6010B[(1)]	<0.050	0.050	mg/l	CS0	12/17/2007	0068691-1	<0.050
Trace Metals, Total, ICP								
Lead	6010B[(1)]	4300	4.7	mg/kg	PMM	12/15/2007	0068513-1	<0.50

[(1)] U.S. Environmental Protection Agency, 1996, Test Methods for Evaluating Solid Waste, SW-846, 3rd ed., Office of Solid Waste and Emergency Response, Washington, DC.

Sample Comments: Results reported in dry weight equivalence.

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Client Site: LI Tungsten
Client Ref.: 41785922.00003

Lab Project ID: **07-9442**
Lab Sample ID: **0712-1729**
Client Sample ID: L-34
Sample Matrix: Solid

Date Sampled: 12/04/2007
Date Received: 12/10/2007

Inorganic Extraction

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Percent Solids	% Solids	91	N/A	%	DAB	12/11/2007	N/A	N/A

Metals

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Trace Metals, TCLP, ICP								
Lead	6010B[1]	<0.050	0.050	mg/l	CS0	12/17/2007	0068691-1	<0.050
Trace Metals, Total, ICP								
Lead	6010B[1]	4100	3.8	mg/kg	PMM	12/15/2007	0068513-1	<0.50

[1] U.S. Environmental Protection Agency, 1996, Test Methods for Evaluating Solid Waste, SW-846, 3rd ed., Office of Solid Waste and Emergency Response, Washington, DC.

Sample Comments: Results reported in dry weight equivalence.

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Client Site: LI Tungsten
Client Ref.: 41785922.00003

Lab Project ID: **07-9442**
Lab Sample ID: **0712-1730**
Client Sample ID: L-36
Sample Matrix: Solid

Date Sampled: 12/04/2007
Date Received: 12/10/2007

Inorganic Extraction

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Percent Solids	% Solids	90	N/A	%	DAB	12/11/2007	N/A	N/A

Metals

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Trace Metals, TCLP, ICP								
Lead	6010B[1]	<0.050	0.050	mg/l	CS0	12/17/2007	0068691-1	<0.050
Trace Metals, Total, ICP								
Lead	6010B[1]	4900	4.1	mg/kg	PMM	12/15/2007	0068513-1	<0.50

[1] U.S. Environmental Protection Agency, 1996, Test Methods for Evaluating Solid Waste, SW-846, 3rd ed., Office of Solid Waste and Emergency Response, Washington, DC.

Sample Comments: Results reported in dry weight equivalence.

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Client Site: LI Tungsten
Client Ref.: 41785922.00003

Lab Project ID: **07-9442**
Lab Sample ID: **0712-1731**
Client Sample ID: L-37
Sample Matrix: Solid

Date Sampled: 12/05/2007
Date Received: 12/10/2007

Inorganic Extraction

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Percent Solids	% Solids	90	N/A	%	DAB	12/11/2007	N/A	N/A

Metals

Test	Method	Result	Reporting Limit	Units	Analyst	Analysis Date	Method Blank ID	Blank Result
Trace Metals, TCLP, ICP								
Lead	6010B[(1)]	0.17	0.050	mg/l	CS0	12/17/2007	0068691-1	<0.050
Trace Metals, Total, ICP								
Lead	6010B[(1)]	7200	4.7	mg/kg	PMM	12/15/2007	0068513-1	<0.50

[(1)] U.S. Environmental Protection Agency, 1996, Test Methods for Evaluating Solid Waste, SW-846, 3rd ed., Office of Solid Waste and Emergency Response, Washington, DC.

Sample Comments: Results reported in dry weight equivalence.

RADIOLOGICAL DOSE ASSESSMENT FOR THE PENNSYLVANIA LANDFILL DISPOSAL OF STABILIZED SOIL FROM THE LI TUNGSTEN, GLEN COVE NEW YORK SITE

Prepared for:

THE LI TUNGSTEN COOPERATIVE GROUP

Prepared by:

SAFETY & ECOLOGY CORPORATION
Through URS PITTSBURGH

SEC Project 126032

APRIL 28, 2008

Subject:
Radiological (risk) dose assessment for the Pennsylvania landfill disposal of stabilized soil (SS) containing small quantities of technologically enhanced naturally occurring radioactive material (TENORM) from the Li Tungsten, Glen Cove New York Site (LTS).

Purpose:
The purpose of this calculation is to estimate the risk, specifically the maximum total effective dose equivalent (TEDE) to the hypothetical critical population group (resident farmer) from the disposal of SS containing small quantities of TENORM (SS-TENORM) from the LTS into a Pennsylvania landfill.

Synopsis:
The maximum TEDE resulting from the disposal of the SS-TENORM in a Pennsylvania landfill to the hypothetical resident farmer is 3.949 millirem/year (mrem/yr) at time equal to 1000 years post placement.

Discussion/Background:
The Li Tungsten Superfund Site is located in the City of Glen Cove, Nassau County, New York, and includes the former Li Tungsten Corporation facility at Herbhill Road and Dickson Lane. As a result of processing of ores at the facility on the Li Tungsten property, and the subsequent disposal of portions of the byproducts of that processing, elevated levels of radiation and certain metals had come to be present at or in the vicinity of the Li Tungsten property. The property is approximately 26 acres.

From April 2006 to August 2007, activities based on a remedy selected in the 1999 ROD were performed on Parcels B and C of the Li Tungsten Superfund Site that included the excavation and segregation of contaminated soils. After the operation, approximately 1,500 cubic yards of RCRA contaminated soils, 30 cubic yards of metals contaminated soils, 555 cubic yards of PCB contaminated soils, and 1,895 cubic yards of radiological contaminated soil remained stockpiled in the Dickson Warehouse located on Parcel C of the Li Tungsten Superfund Site. The PCB contaminated soils and the radiological contaminated soils were loaded during mid November 2007, and then transported, and disposed of off-site at appropriate disposal facilities. Approximately 1,500 cubic yards of soil remain in six stockpiles of approximately 250 cubic yards each.

URS performed waste characterization sampling on December 21, 2007 in accordance with the Waste Characterization Sampling Plan dated December18, 2007. Six (6) grab samples, one from each stockpile, were collected and analyzed for volatile organics. Five (5) grab samples were collected from each of the six stockpiles. The thirty (30) discrete grab samples were composited into three (3) composite samples, each representing two stockpiles (i.e., 500 cubic yards). These samples were analyzed for General Chemistry, Metals, PCBs, Pesticides, Semi-Volatiles, Herbicides, and Gamma Spectrometry. Analytical analyses results are presented in Attachment A. The sample results for these samples met the waste acceptance criteria for GROWS and Tulleytown Landfills. However, the State of Pennsylvania Radiation Bureau requires a risk assessment for the placement of this material in a state landfill.

Methodology:
The TEDE estimate was calculated using the RESRAD computer code (ANL 2005) using the hypothetical resident farmer scenario with all pathways selected except radon. The resident farmer scenario assumes that the waste is disposed in the landfill, the landfill is closed, the farmer builds a house, raises crops, and keeps livestock on the affected area for family consumption. The Pennsylvania minimum landfill structure (Figure 1) is the geometry used. This geometry is limiting and is applicable to any of the Pennsylvania landfills.

The assessment time frame, 1000 years after placement of the waste, is the same time frame used by the state to evaluate risk from residual radioactivity on decommissioned sites within the state. The limit for exposure to the public from decommissioned sites within the state is 25 mrem/yr TEDE.

Calculations:
SS-TENORM Source Term
A review of the gamma spectroscopy analysis results (Attachment A) was performed to evaluate the equilibrium status of the three naturally occurring radioactive series making up TENORM:

- Uranium Series – Parent U-238, 13 progeny including Th-230 and Ra-226.
- Thorium Series – Parent Th-232, 10 progeny including Ac-228 and Ra-228.
- Actinium Series – Parent U-235, 11 progeny

Based on the review of the results, the following average activity concentrations for the natural decay series were determined for the remaining 1,500 cubic yards of soil to be disposed of in Pennsylvania landfills:

- Uranium Series – 1.95 pCi/g for the entire series in equilibrium with the exception of Ra-226 = 3.28 pCi/g
- Thorium Series – 0.935 pCi/g for the entire series in equilibrium
- Actinium Series – 0.152 pCi/g for the entire series in equilibrium

Landfill Source Term
RESRAD landfill lift nuclide concentration (pCi/g) was estimated by multiplying the average radionuclide activity concentration by a dilution factor derived by dividing the volume of SS-TENORM by the volume of a standard landfill lift. The calculation is summarized in the following table.

Table 1 - Landfill Radionuclide Activity Concentration Calculations

Landfill Dilution		
Description	Volume (yd^3)	Volume (m^3)
Landfill lift	-	9.07E+03
SS-TENORM	1500	1.15E+03
Dilution Factor (DF)= (GAC m^3 / Landfill Lift m^3)		1.27E-01

SS-TENORM Samples	pCi/g
Average Uranium (Except Ra-226)Series Activity [U-238]=	1.95
Average Radium-226 [Ra-226]=	3.28
Average Thorium Series Activity [Th-232]=	0.935
Average Actinium Series Activity [U-235]=	0.152

Average Landfill Concentration	pCi/g
Uranium (Except Rad-226)Series Activity [U-238]=	2.48E-01
Average Radium-226 [Ra-226]=	4.17E-01
Thorium Series Activity [Th-232]=	1.19E-01
Actinium Series Activity [U-235]=	1.93E-02

Input parameters/Assumptions:
The landfill structure per Pennsylvania regulations is illustrated in Figure 1.

Synthetic membranes are not considered due to the potential for failure of these membranes during the 1000-year evaluation period.

The SS-TENORM waste is assumed to mix homogenously with other waste within a default landfill lift. The volume of a "lift" used for the mixing volume is 9.07E+03 m^3 or 200' x 200' x 8' (PADEP-BRP 2006).

The contaminated zone density was assumed to be the conservative default value of 1.5 g/cc since the SS-TENORM is stabilized soil of an unknown density.

Table 2 lists the RESRAD non-default input parameters with references.

Table 2 - RESRAD Non-default Input Parameter Assignments Summary

Input Screen	Identifier	Description	PA Landfill "Lift"	Units	Default Value	Reference
R011	AREA	Area of contaminated zone	3.716E+03	m^2	1.000E+04	R1
R011	THICK0	Thickness of contaminated zone	2.440E+00	m	2.000E+00	R1
R011	LCZPAQ	Length parallel to aquifer flow	6.096E+01	m	1.000E+02	R1
R012	S1(*1*)	Initial concentration of principal radionuclide *1*	Ac-227 1.93E-02	pCi/g	0.000E+00	R2
R012	S1(*2*)	Initial concentration of principal radionuclide *2*	Pa-231 1.93E-02	pCi/g	0.000E+00	R2
R012	S1(*3*)	Initial concentration of principal radionuclide *3*	Pb-210 2.48E-01	pCi/g	0.000E+00	R2
R012	S1(*4*)	Initial concentration of principal radionuclide *4*	Ra-226 4.17E-01	pCi/g	0.000E+00	R2
R012	S1(*5*)	Initial concentration of principal radionuclide *5*	Ra-228 1.19E-01	pCi/g	0.000E+00	R2
R012	S1(*6*)	Initial concentration of principal radionuclide *6*	Th-228 1.19E-01	pCi/g	0.000E+00	R2
R012	S1(*7*)	Initial concentration of principal radionuclide *7*	Th-230 2.48E-01	pCi/g	0.000E+00	R2
R012	S1(*8*)	Initial concentration of principal radionuclide *8*	Th-232 1.19E-01	pCi/g	0.000E+00	R2
R012	S1(*9*)	Initial concentration of principal radionuclide *9*	U-234 2.48E-01	pCi/g	0.000E+00	R2
R012	S1(*10*)	Initial concentration of principal radionuclide *10*	U-235 1.93E-02	pCi/g	0.000E+00	R2
R012	S1(*11*)	Initial concentration of principal radionuclide *11*	U-238 2.48E-01	pCi/g	0.000E+00	R2
R013	COVER0	Cover depth	9.150E-01	m	0.000E+00	R1
R015	NS<=5	Number of unsaturated zone strata	3	-	1	R1
R015	H(z), 1<=z=NS	Unsaturated zone 1, thickness	7.620E-01	m	4.000E+00	R1
R015	DENSUZ(*z*)	Unsaturated zone 1, soil density	1.520E+00	g/cm^3	1.500E+01	R1,R3 Sand
R015	TPUZ	Unsaturated zone 1, total porosity	3.900E-01	d.d.f.	4.000E-01	R1
R015	EPUZ	Unsaturated zone 1, effective porosity	3.000E-01	d.d.f.	2.000E-01	R1
R015	FCUZ(*z*)	Unsaturated zone 1, field capacity	9.000E-02	d.d.f.	2.000E-01	R1
R015	BUZ(*z*)	Unsaturated zone 1, soil-specific b parameter	4.050E+00	dimensionless	5.300E+00	R1
R015	HCUZ(*z*)	Unsaturated zone 1, hydraulic conductivity	5.550E+03	m/yr	1.000E+01	R1
R015	H(z), 1<=z=NS	Unsaturated zone 2, thickness	1.520E-01	m	4.000E+00	R1
R015	DENSUZ(*z*)	Unsaturated zone 2, soil density	1.200E+00	g/cm^3	1.500E+01	R1, R3 Clay
R015	TPUZ	Unsaturated zone 2, total porosity	4.200E-01	d.d.f.	4.000E-01	R1
R015	EPUZ	Unsaturated zone 2, effective porosity	6.000E-02	d.d.f.	2.000E-01	R1

Input Screen	Identifier	Description	PA Landfill "Lift"	Units	Default Value	Reference
R015	FCUZ(*z*)	Unsaturated zone 2, field capacity	3.600E-01	d.d.f.	2.000E-01	R1
R015	BUZ(*z*)	Unsaturated zone 2, soil-specific b parameter	1.140E+01	dimensionless	5.300E+00	R1
R015	HCUZ(*z*)	Unsaturated zone 2, hydraulic conductivity	4.050E+01	m/yr	1.000E+01	R1
R015	H(z), 1<=z=NS	Unsaturated zone 3, thickness	2.438E+00	m	4.000E+00	R1
R016	DCNUCS(*1*)	Distribution coefficients for radionuclide *1* in unsaturated zone 1	Ac-227 4.500E+02	cm^3/g	Nuclide specific	R1, R3 Unsat. zone 1 – Sand
R016	DCNUCS(*1*)	Distribution coefficients for radionuclide *1* in unsaturated zone 2	Ac-227 2.400E+03	cm^3/g	Nuclide specific	R1, R3 Unsat. zone 2 – Clay
R016	DCNUCS(*2*)	Distribution coefficients for radionuclide *2* in unsaturated zone 1	Pa-231 5.500E+02	cm^3/g	Nuclide specific	R1, R3
R016	DCNUCS(*2*)	Distribution coefficients for radionuclide *2* in unsaturated zone 2	Pa-231 2.700e+03	cm^3/g	Nuclide specific	R1, R3
R016	DCNUCS(*3*)	Distribution coefficients for radionuclide *3* in unsaturated zone 1	Pb-210 2.700E+02	cm^3/g	Nuclide specific	R1, R3
R016	DCNUCS(*3*)	Distribution coefficients for radionuclide *3* in unsaturated zone 2	Pb-210 5.500E+02	cm^3/g	Nuclide specific	R1, R3
R016	DCNUCS(*4*)	Distribution coefficients for radionuclide *4* in unsaturated zone 1	Ra-226 5.000E+02	cm^3/g	Nuclide specific	R1, R3
R016	DCNUCS(*4*)	Distribution coefficients for radionuclide *4* in unsaturated zone 2	Ra-226 9.100E+03	cm^3/g	Nuclide specific	R1, R3
R016	DCNUCS(*5*)	Distribution coefficients for radionuclide *5* in unsaturated zone 1	Ra-228 5.000E+02	cm^3/g	Nuclide specific	R1, R3
R016	DCNUCS(*5*)	Distribution coefficients for radionuclide *5* in unsaturated zone 2	Ra-228 9.100E+03	cm^3/g	Nuclide specific	R1, R3
R016	DCNUCS(*6*)	Distribution coefficients for radionuclide *6* in unsaturated zone 1	Th-228 3.200E+03	cm^3/g	Nuclide specific	R1, R3
R016	DCNUCS(*6*)	Distribution coefficients for radionuclide *6* in unsaturated zone 2	Th-228 5.800E+03	cm^3/g	Nuclide specific	R1, R3
R016	DCNUCS(*7*)	Distribution coefficients for radionuclide *7* in unsaturated zone 1	Th-230 3.200E+03	cm^3/g	Nuclide specific	R1, R3
R016	DCNUCS(*7*)	Distribution coefficients for radionuclide *7* in unsaturated zone 2	Th-230 5.800E+03	cm^3/g	Nuclide specific	R1, R3
R016	DCNUCS(*8*)	Distribution coefficients for radionuclide *8* in unsaturated zone 1	Th-232 3.200E+03	cm^3/g	Nuclide specific	R1, R3

Input Screen	Identifier	Description	PA Landfill "Lift"	Units	Default Value	Reference
R016	DCNUCS(*8*)	Distribution coefficients for radionuclide *8* in unsaturated zone 2	Th-232 5.800E+03	cm^3/g	Nuclide specific	R1, R3
R016	DCNUCS(*9*)	Distribution coefficients for radionuclide *9* in unsaturated zone 1	U-234 3.500E+01	cm^3/g	Nuclide specific	R1, R3
R016	DCNUCS(*9*)	Distribution coefficients for radionuclide *9* in unsaturated zone 2	U-234 1.600E+03	cm^3/g	Nuclide specific	R1, R3
R016	DCNUCS(*10*)	Distribution coefficients for radionuclide *10* in unsaturated zone 1	U-235 3.500E+01	cm^3/g	Nuclide specific	R1, R3
R016	DCNUCS(*10*)	Distribution coefficients for radionuclide *10* in unsaturated zone 2	U-235 1.600E+03	cm^3/g	Nuclide specific	R1, R3
R016	DCNUCS(*11*)	Distribution coefficients for radionuclide *11* in unsaturated zone 1	U-238 3.500E+01	cm^3/g	Nuclide specific	R1, R3
R016	DCNUCS(*11*)	Distribution coefficients for radionuclide *11* in unsaturated zone 2	U-238 1.600E+03	cm^3/g	Nuclide specific	R1, R3

a. d.d.f. = dimensionless decimal fraction

Input Parameter Table References

R1 PADEP-BRP, 2006 – Landfill Disposal Evaluation of TENORM Contaminated Soils from Foote Minerals Co.
R2 Table 1 derivation of lift activity concentration
R3 ANL 1993, Table 32.1

Results:
The maximum TEDE to the hypothetical resident farmer 3.949E+00 millirem/year at time equal 1000 years. The result is conservative for the following reasons:

- No correction of the source term was made for background activity concentrations of the natural decay series radionuclides.
- A residential farmer scenario was used including dose from groundwater pathways, even though farming and well drilling on top of a retired landfill is highly unlikely.
- Almost all of the input parameters are default (conservative) values.

Attachment B contains the RESRAD Output File Report.

References:
ANL (Argonne National Laboratory), 1993. Environmental Assessment and Information Sciences Division, *Data Collection Handbook to Support Modeling Impacts of Radioactive Material in Soil.*

ANL (Argonne National Laboratory), 2005. Environmental Assessment Division, RESRAD for Windows, Version 6.3.

PADEP-BRP, 2006. Landfill Disposal Evaluation of TENORM Contaminated Soils from Foote Minerals Co.

Attachments:
A) Sample Analytical Analyses Results
B) RESRAD Summary Report

Figure 1

PA Minimum Landfill Design

Cover	24 in - 0.610m	Soil	Title 25 PA Code 273.234.a.3 Final cover
Liner			
Intermediate Cover	12 in - 0.305m	Soil	Title 25 PA Code 273.233.c.1 Intermediate cover thickness
Waste / Contaminated Zone	Variable depths	Waste	
Protective Cover (Unsat 1)	18 in - 0.457m	Sand	Title 25 PA Code 273.257.b.3 Protective cover thickness
Liner			
(Unsat 1)	12 in - 0.305m	Sand	Title 25 PA Code 273.255.b.1 Leachate detection zone thickness
Liner			
(Unsat 2)	6 in - 0.152m	Clay	Title 25 PA Code 273.253.b.1 clay sub-base layer
(Unsat 3)	8 ft - 2.438m	Soil	Title 25 PA Code 273.252.b Minimum distance from sub-base to water table
Saturated	Saturation Zone	Water	

P:\2007 Projects\HP Projects 2007\WR Grace TENORM 070-455\
PA_Landfill_Design_State_min_reqirements_REV 1.xls

Attachment A
Soil Sample Analytical Analyses Reports

Parameter	Units	0712-4708	0712-4709	0712-4710	0712-4711	0712-4712	0712-4713
Volatiles							
Benzene	ug/l	100	<50	<50	<50	<50	<50
2-Butanone	ug/l	<5000	<5000	<5000	<5000	<5000	<5000
Carbon Tetrachloride	ug/l	<50	<50	<50	<50	<50	<50
Chlorobenzene	ug/l	<1000	<1000	<1000	<1000	<1000	<1000
Chloroform	ug/l	<500	<500	<500	<500	<500	<500
1,2-Dichloroethane	ug/l	<50	<50	<50	<50	<50	<50
1,1-Dichloroethene	ug/l	<50	<50	<50	<50	<50	<50
Tetrachloroethene	ug/l	<50	<50	<50	<50	<50	<50
Trichloroethene	ug/l	<50	<50	<50	<50	<50	<50
Vinyl chloride	ug/l	<50	<50	<50	<50	<50	<50
General Chemistry		**0712-4714**	**0712-4715**	**0712-4716**			
Ammonia (ASTM)	mg/l	0.34	0.51	0.35			
Chemical Oxygen Demand (ASTM)	mg/l	31	29	31			
Cyanide (Reactive)	mg/l	<1.1	<1.1	<1.1			
Flash Point	F	>200	>200	>200			
Oil & Grease	mg/kg	560	440	490			
Oil & Grease (ASTM)	mg/l	<5	<5	<5			
Paint Filter	n/a	Pass	Pass	Pass			
pH	pH	11.27	11.45	9.82			
Sufide (Reactive)	mg/kg	<11	<11	<11			
Total Solids (ASTM)	mg/l	300	310	270			
Total Solids @ 105C	%	91	91	91			
Total Volatile Solids	%	<10	<10	<10			
Inorganic Extraction		**0712-4714**	**0712-4715**	**0712-4716**			
Percent Solids	%	90	90	90			
Metals		**0712-4714**	**0712-4715**	**0712-4716**			
Mercury	mg/l	<0.01	<0.01	<0.01			
Aresenic	mg/l	<0.05	<0.05	<0.05			
Barium	mg/l	<1	<1	<1			
Cadmium	mg/l	<0.05	<0.05	<0.05			
Chromium	mg/l	<0.05	<0.05	<0.05			
Lead	mg/l	0.24	0.26	2.2			
Selenium	mg/l	<0.1	<0.1	<0.1			
Silver	mg/l	<0.05	<0.05	<0.05			
PCBs		**0712-4714**	**0712-4715**	**0712-4716**			
Arochlor-1016	mg/kg	<1.8	<1.8	<1.9			
Arochlor-1221	mg/kg	<1.8	<1.8	<1.9			
Arochlor-1232	mg/kg	<1.8	<1.8	<1.9			
Arochlor-1242	mg/kg	<1.8	<1.8	<1.9			
Arochlor-1248	mg/kg	8	10	11			
Arochlor-1254	mg/kg	<1.8	<1.8	<1.9			
Arochlor-1260	mg/kg	<1.8	<1.8	<1.9			
PCB Total-TCL	mg/kg	8	10	11			
Pesticides	**Units**	**0712-4714**	**0712-4715**	**0712-4716**			
gamma-BHC	ug/l	<10	<10	<10			
Technical Chlorodane	ug/l	<10	<10	<10			
Endrin	ug/l	<1	<1	<1			

Heptachlor	ug/l	<0.5	<0.5	<0.5			
Heptachlor Epoxide	ug/l	<0.5	<0.5	<0.5			
Methoxychlor	ug/l	<100	<100	<100			
Toxaphene	ug/l	<50	<50	<50			
Semivolatiles		**0712-4714**	**0712-4715**	**0712-4716**			
Cresol (Total)	ug/l	<5000	<5000	<5000			
1,4-Dichlorobenzene	ug/l	<500	<500	<500			
2,4-Dinitrotoluene	ug/l	<100	<100	<100			
Hexachlorobenzene	ug/l	<100	<100	<100			
Hexachlorobutadiene	ug/l	<100	<100	<100			
Hexachloroethane	ug/l	<500	<500	<500			
Nitrobenzene	ug/l	<100	<100	<100			
Pentachlorophenol	ug/l	<5000	<5000	<5000			
Pyridine	ug/l	<500	<500	<500			
2,4,5-Trichlorophenol	ug/l	<5000	<5000	<5000			
2,4,6-Trichlorophenol	ug/l	<100	<100	<100			
Herbicides		**0712-4714**	**0712-4715**	**0712-4716**			
2,4-D	ug/l	ND	0.0784	ND			
2,4,5-TP	ug/l	ND	ND	ND			
Volatiles		**0712-4714**	**0712-4715**	**0712-4716**			
Benzene	ug/l	<50	120	<50			
2-Butanone	ug/l	<5000	<5000	<5000			
Carbon Tetrachloride	ug/l	<50	<50	<50			
Chlorobenzene	ug/l	<1000	<1000	<1000			
Chloroform	ug/l	<500	<500	<500			
1,2-Dichloroethane	ug/l	<50	<50	<50			
1,1-Dichloroethene	ug/l	<50	<50	<50			
Tetrachloroethene	ug/l	<50	<50	<50			
Trichloroethene	ug/l	<50	<50	<50			
Vinyl chloride	ug/l	<50	<50	<50			
Gamma Spectrometry		**0712-4714**	**0712-4715**	**0712-4716**			
Bi-214	pCi/g (MDC)	0.769 ± 0.099 (0.020)	0.934 ± 0.127 (0.042)	0.894 ± 0.107 (0.020)			
Pb-214	pCi/g (MDC)	0.789 ± 0.086 (0.017)	1.07 ± 0.145 (0.033)	0.992 ± 0.110 (0.021)			
Ra-226	pCi/g (MDC)	2.62 ± 0.714 (0.230)	3.29 ± 1.53 (0.729)	3.92 ± 1.06 (0.309)			
Ac-228	pCi/g (MDC)	0.786 ± 0.131 (0.040)	0.980 ± 0.193 (0.066)	1.04 ± 0.152 (0.042)			
Th-228	pCi/g (MDC)	0.786 ± 0.131 (0.040)	0.980 ± 0.193 (0.066)	1.04 ± 0.152 (0.042)			
Th-230	pCi/g (MDC)	2.33 ± 0.621 (0.192)	2.07 ± 1.75 (0.898)	1.45 ± 0.642 (0.303)			
Th-232	pCi/g (MDC)	0.786 ± 0.131 (0.040)	0.980 ± 0.193 (0.066)	1.04 ± 0.152 (0.042)			
U-234	pCi/g (MDC)	2.33 ± 0.621 (0.192)	2.07 ± 1.75 (0.898)	1.45 ± 0.642 (0.303)			
U-235	pCi/g (MDC)	0.103 ± 0.032 (0.084)	0.179 ± 0.085 (0.231)	0.174 ± 0.044 (0.096)			
U-238	pCi/g (MDC)	2.33 ± 0.621 (0.192)	2.07 ± 1.75 (0.898)	1.45 ± 0.642 (0.303)			

Attachment B
RESRAD Summary Report

Summary : Li Tungsten Dickson Warehouse Waste
File : Li Tungsten Dickson Warehouse Waste.RAD

Table of Contents

Part I: Mixture Sums and Single Radionuclide Guidelines

Dose Conversion Factor (and Related) Parameter Summary
File: FGR 13 MORBIDITY

Menu	Parameter	Current Value	Base Case*	Parameter Name
B-1	Dose conversion factors for inhalation, mrem/pCi:			
B-1	Ac-227+D	6.724E+00	6.700E+00	DCF2(1)
B-1	Pa-231	1.280E+00	1.280E+00	DCF2(2)
B-1	Pb-210+D	2.320E-02	1.360E-02	DCF2(3)
B-1	Ra-226+D	8.594E-03	8.580E-03	DCF2(4)
B-1	Ra-228+D	5.078E-03	4.770E-03	DCF2(5)
B-1	Th-228+D	3.454E-01	3.420E-01	DCF2(6)
B-1	Th-230	3.260E-01	3.260E-01	DCF2(7)
B-1	Th-232	1.640E+00	1.640E+00	DCF2(8)
B-1	U-234	1.320E-01	1.320E-01	DCF2(9)
B-1	U-235+D	1.230E-01	1.230E-01	DCF2(10)
B-1	U-238	1.180E-01	1.180E-01	DCF2(11)
B-1	U-238+D	1.180E-01	1.180E-01	DCF2(12)
D-1	Dose conversion factors for ingestion, mrem/pCi:			
D-1	Ac-227+D	1.480E-02	1.410E-02	DCF3(1)
D-1	Pa-231	1.060E-02	1.060E-02	DCF3(2)
D-1	Pb-210+D	7.276E-03	5.370E-03	DCF3(3)
D-1	Ra-226+D	1.321E-03	1.320E-03	DCF3(4)
D-1	Ra-228+D	1.442E-03	1.440E-03	DCF3(5)
D-1	Th-228+D	8.086E-04	3.960E-04	DCF3(6)
D-1	Th-230	5.480E-04	5.480E-04	DCF3(7)
D-1	Th-232	2.730E-03	2.730E-03	DCF3(8)
D-1	U-234	2.830E-04	2.830E-04	DCF3(9)
D-1	U-235+D	2.673E-04	2.660E-04	DCF3(10)
D-1	U-238	2.550E-04	2.550E-04	DCF3(11)
D-1	U-238+D	2.687E-04	2.550E-04	DCF3(12)
D-34	Food transfer factors:			
D-34	Ac-227+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(1,1)
D-34	Ac-227+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	2.000E-05	2.000E-05	RTF(1,2)
D-34	Ac-227+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-05	2.000E-05	RTF(1,3)
D-34				
D-34	Pa-231 , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(2,1)
D-34	Pa-231 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	5.000E-03	5.000E-03	RTF(2,2)
D-34	Pa-231 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(2,3)
D-34				
D-34	Pb-210+D , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(3,1)
D-34	Pb-210+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	8.000E-04	8.000E-04	RTF(3,2)
D-34	Pb-210+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	3.000E-04	3.000E-04	RTF(3,3)
D-34				
D-34	Ra-226+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(4,1)
D-34	Ra-226+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(4,2)
D-34	Ra-226+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(4,3)
D-34				
D-34	Ra-228+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(5,1)
D-34	Ra-228+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(5,2)
D-34	Ra-228+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(5,3)
D-34				

Dose Conversion Factor (and Related) Parameter Summary (continued)
File: FGR 13 MORBIDITY

Menu	Parameter	Current Value	Base Case*	Parameter Name
D-34	Th-228+D , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(6,1)
D-34	Th-228+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(6,2)
D-34	Th-228+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(6,3)
D-34				
D-34	Th-230 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(7,1)
D-34	Th-230 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(7,2)
D-34	Th-230 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(7,3)
D-34				
D-34	Th-232 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(8,1)
D-34	Th-232 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(8,2)
D-34	Th-232 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(8,3)
D-34				
D-34	U-234 , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(9,1)
D-34	U-234 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(9,2)
D-34	U-234 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(9,3)
D-34				
D-34	U-235+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(10,1)
D-34	U-235+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(10,2)
D-34	U-235+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(10,3)
D-34				
D-34	U-238 , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(11,1)
D-34	U-238 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(11,2)
D-34	U-238 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(11,3)
D-34				
D-34	U-238+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(12,1)
D-34	U-238+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(12,2)
D-34	U-238+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(12,3)
D-5	Bioaccumulation factors, fresh water, L/kg:			
D-5	Ac-227+D , fish	1.500E+01	1.500E+01	BIOFAC(1,1)
D-5	Ac-227+D , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(1,2)
D-5				
D-5	Pa-231 , fish	1.000E+01	1.000E+01	BIOFAC(2,1)
D-5	Pa-231 , crustacea and mollusks	1.100E+02	1.100E+02	BIOFAC(2,2)
D-5				
D-5	Pb-210+D , fish	3.000E+02	3.000E+02	BIOFAC(3,1)
D-5	Pb-210+D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(3,2)
D-5				
D-5	Ra-226+D , fish	5.000E+01	5.000E+01	BIOFAC(4,1)
D-5	Ra-226+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(4,2)
D-5				
D-5	Ra-228+D , fish	5.000E+01	5.000E+01	BIOFAC(5,1)
D-5	Ra-228+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(5,2)
D-5				
D-5	Th-228+D , fish	1.000E+02	1.000E+02	BIOFAC(6,1)
D-5	Th-228+D , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(6,2)
D-5				
D-5	Th-230 , fish	1.000E+02	1.000E+02	BIOFAC(7,1)
D-5	Th-230 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(7,2)
D-5				

Dose Conversion Factor (and Related) Parameter Summary (continued)
File: FGR 13 MORBIDITY

Menu	Parameter	Current Value	Base Case*	Parameter Name
D-5	Th-232 , fish	1.000E+02	1.000E+02	BIOFAC(8,1)
D-5	Th-232 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(8,2)
D-5				
D-5	U-234 , fish	1.000E+01	1.000E+01	BIOFAC(9,1)
D-5	U-234 , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(9,2)
D-5				
D-5	U-235+D , fish	1.000E+01	1.000E+01	BIOFAC(10,1)
D-5	U-235+D , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(10,2)
D-5				
D-5	U-238 , fish	1.000E+01	1.000E+01	BIOFAC(11,1)
D-5	U-238 , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(11,2)
D-5				
D-5	U-238+D , fish	1.000E+01	1.000E+01	BIOFAC(12,1)
D-5	U-238+D , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(12,2)

*Base Case means Default.Lib w/o Associate Nuclide contributions.

Site-Specific Parameter Summary

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R011	Area of contaminated zone (m**2)	3.716E+03	1.000E+04	---	AREA
R011	Thickness of contaminated zone (m)	2.440E+00	2.000E+00	---	THICK0
R011	Length parallel to aquifer flow (m)	6.096E+01	1.000E+02	---	LCZPAQ
R011	Basic radiation dose limit (mrem/yr)	2.500E+01	3.000E+01	---	BRDL
R011	Time since placement of material (yr)	0.000E+00	0.000E+00	---	TI
R011	Times for calculations (yr)	1.000E+00	1.000E+00	---	T(2)
R011	Times for calculations (yr)	3.000E+00	3.000E+00	---	T(3)
R011	Times for calculations (yr)	1.000E+01	1.000E+01	---	T(4)
R011	Times for calculations (yr)	3.000E+01	3.000E+01	---	T(5)
R011	Times for calculations (yr)	1.000E+02	1.000E+02	---	T(6)
R011	Times for calculations (yr)	3.000E+02	3.000E+02	---	T(7)
R011	Times for calculations (yr)	1.000E+03	1.000E+03	---	T(8)
R011	Times for calculations (yr)	not used	0.000E+00	---	T(9)
R011	Times for calculations (yr)	not used	0.000E+00	---	T(10)
R012	Initial principal radionuclide (pCi/g): Ac-227	1.930E-02	0.000E+00	---	S1(1)
R012	Initial principal radionuclide (pCi/g): Pa-231	1.930E-02	0.000E+00	---	S1(2)
R012	Initial principal radionuclide (pCi/g): Pb-210	2.480E-01	0.000E+00	---	S1(3)
R012	Initial principal radionuclide (pCi/g): Ra-226	4.170E-01	0.000E+00	---	S1(4)
R012	Initial principal radionuclide (pCi/g): Ra-228	1.190E-01	0.000E+00	---	S1(5)
R012	Initial principal radionuclide (pCi/g): Th-228	1.190E-01	0.000E+00	---	S1(6)
R012	Initial principal radionuclide (pCi/g): Th-230	2.480E-01	0.000E+00	---	S1(7)
R012	Initial principal radionuclide (pCi/g): Th-232	1.190E-01	0.000E+00	---	S1(8)
R012	Initial principal radionuclide (pCi/g): U-234	2.480E-01	0.000E+00	---	S1(9)
R012	Initial principal radionuclide (pCi/g): U-235	1.930E-02	0.000E+00	---	S1(10)
R012	Initial principal radionuclide (pCi/g): U-238	2.480E-01	0.000E+00	---	S1(11)
R012	Concentration in groundwater (pCi/L): Ac-227	not used	0.000E+00	---	W1(1)
R012	Concentration in groundwater (pCi/L): Pa-231	not used	0.000E+00	---	W1(2)
R012	Concentration in groundwater (pCi/L): Pb-210	not used	0.000E+00	---	W1(3)
R012	Concentration in groundwater (pCi/L): Ra-226	not used	0.000E+00	---	W1(4)
R012	Concentration in groundwater (pCi/L): Ra-228	not used	0.000E+00	---	W1(5)
R012	Concentration in groundwater (pCi/L): Th-228	not used	0.000E+00	---	W1(6)
R012	Concentration in groundwater (pCi/L): Th-230	not used	0.000E+00	---	W1(7)
R012	Concentration in groundwater (pCi/L): Th-232	not used	0.000E+00	---	W1(8)
R012	Concentration in groundwater (pCi/L): U-234	not used	0.000E+00	---	W1(9)
R012	Concentration in groundwater (pCi/L): U-235	not used	0.000E+00	---	W1(10)
R012	Concentration in groundwater (pCi/L): U-238	not used	0.000E+00	---	W1(11)
R013	Cover depth (m)	9.150E-01	0.000E+00	---	COVER0
R013	Density of cover material (g/cm**3)	1.500E+00	1.500E+00	---	DENSCV
R013	Cover depth erosion rate (m/yr)	1.000E-03	1.000E-03	---	VCV
R013	Density of contaminated zone (g/cm**3)	1.500E+00	1.500E+00	---	DENSCZ
R013	Contaminated zone erosion rate (m/yr)	1.000E-03	1.000E-03	---	VCZ
R013	Contaminated zone total porosity	4.000E-01	4.000E-01	---	TPCZ
R013	Contaminated zone field capacity	2.000E-01	2.000E-01	---	FCCZ
R013	Contaminated zone hydraulic conductivity (m/yr)	1.000E+01	1.000E+01	---	HCCZ
R013	Contaminated zone b parameter	5.300E+00	5.300E+00	---	BCZ
R013	Average annual wind speed (m/sec)	2.000E+00	2.000E+00	---	WIND
R013	Humidity in air (g/m**3)	not used	8.000E+00	---	HUMID
R013	Evapotranspiration coefficient	5.000E-01	5.000E-01	---	EVAPTR

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R013	Precipitation (m/yr)	1.000E+00	1.000E+00	---	PRECIP
R013	Irrigation (m/yr)	2.000E-01	2.000E-01	---	RI
R013	Irrigation mode	overhead	overhead	---	IDITCH
R013	Runoff coefficient	2.000E-01	2.000E-01	---	RUNOFF
R013	Watershed area for nearby stream or pond (m**2)	1.000E+06	1.000E+06	---	WAREA
R013	Accuracy for water/soil computations	1.000E-03	1.000E-03	---	EPS
R014	Density of saturated zone (g/cm**3)	1.500E+00	1.500E+00	---	DENSAQ
R014	Saturated zone total porosity	4.000E-01	4.000E-01	---	TPSZ
R014	Saturated zone effective porosity	2.000E-01	2.000E-01	---	EPSZ
R014	Saturated zone field capacity	2.000E-01	2.000E-01	---	FCSZ
R014	Saturated zone hydraulic conductivity (m/yr)	1.000E+02	1.000E+02	---	HCSZ
R014	Saturated zone hydraulic gradient	2.000E-02	2.000E-02	---	HGWT
R014	Saturated zone b parameter	5.300E+00	5.300E+00	---	BSZ
R014	Water table drop rate (m/yr)	1.000E-03	1.000E-03	---	VWT
R014	Well pump intake depth (m below water table)	1.000E+01	1.000E+01	---	DWIBWT
R014	Model: Nondispersion (ND) or Mass-Balance (MB)	ND	ND	---	MODEL
R014	Well pumping rate (m**3/yr)	2.500E+02	2.500E+02	---	UW
R015	Number of unsaturated zone strata	3	1	---	NS
R015	Unsat. zone 1, thickness (m)	7.620E-01	4.000E+00	---	H(1)
R015	Unsat. zone 1, soil density (g/cm**3)	1.520E+00	1.500E+00	---	DENSUZ(1)
R015	Unsat. zone 1, total porosity	3.900E-01	4.000E-01	---	TPUZ(1)
R015	Unsat. zone 1, effective porosity	3.000E-01	2.000E-01	---	EPUZ(1)
R015	Unsat. zone 1, field capacity	9.000E-02	2.000E-01	---	FCUZ(1)
R015	Unsat. zone 1, soil-specific b parameter	4.050E+00	5.300E+00	---	BUZ(1)
R015	Unsat. zone 1, hydraulic conductivity (m/yr)	5.550E+03	1.000E+01	---	HCUZ(1)
R015	Unsat. zone 2, thickness (m)	1.520E-01	0.000E+00	---	H(2)
R015	Unsat. zone 2, soil density (g/cm**3)	1.200E+00	1.500E+00	---	DENSUZ(2)
R015	Unsat. zone 2, total porosity	4.200E-01	4.000E-01	---	TPUZ(2)
R015	Unsat. zone 2, effective porosity	6.000E-02	2.000E-01	---	EPUZ(2)
R015	Unsat. zone 2, field capacity	3.600E-01	2.000E-01	---	FCUZ(2)
R015	Unsat. zone 2, soil-specific b parameter	1.140E+01	5.300E+00	---	BUZ(2)
R015	Unsat. zone 2, hydraulic conductivity (m/yr)	4.050E+01	1.000E+01	---	HCUZ(2)
R015	Unsat. zone 3, thickness (m)	2.438E+00	0.000E+00	---	H(3)
R015	Unsat. zone 3, soil density (g/cm**3)	1.500E+00	1.500E+00	---	DENSUZ(3)
R015	Unsat. zone 3, total porosity	4.000E-01	4.000E-01	---	TPUZ(3)
R015	Unsat. zone 3, effective porosity	2.000E-01	2.000E-01	---	EPUZ(3)
R015	Unsat. zone 3, field capacity	2.000E-01	2.000E-01	---	FCUZ(3)
R015	Unsat. zone 3, soil-specific b parameter	5.300E+00	5.300E+00	---	BUZ(3)
R015	Unsat. zone 3, hydraulic conductivity (m/yr)	1.000E+01	1.000E+01	---	HCUZ(3)

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016	Distribution coefficients for Ac-227				
R016	Contaminated zone (cm**3/g)	2.000E+01	2.000E+01	---	DCNUCC(1)
R016	Unsaturated zone 1 (cm**3/g)	4.500E+02	2.000E+01	---	DCNUCU(1,1)
R016	Unsaturated zone 2 (cm**3/g)	2.400E+03	2.000E+01	---	DCNUCU(1,2)
R016	Unsaturated zone 3 (cm**3/g)	2.000E+01	2.000E+01	---	DCNUCU(1,3)
R016	Saturated zone (cm**3/g)	2.000E+01	2.000E+01	---	DCNUCS(1)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	6.758E-03	ALEACH(1)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(1)
R016	Distribution coefficients for Pa-231				
R016	Contaminated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCC(2)
R016	Unsaturated zone 1 (cm**3/g)	5.500E+02	5.000E+01	---	DCNUCU(2,1)
R016	Unsaturated zone 2 (cm**3/g)	2.700E+03	5.000E+01	---	DCNUCU(2,2)
R016	Unsaturated zone 3 (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCU(2,3)
R016	Saturated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCS(2)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.721E-03	ALEACH(2)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(2)
R016	Distribution coefficients for Pb-210				
R016	Contaminated zone (cm**3/g)	1.000E+02	1.000E+02	---	DCNUCC(3)
R016	Unsaturated zone 1 (cm**3/g)	2.700E+02	1.000E+02	---	DCNUCU(3,1)
R016	Unsaturated zone 2 (cm**3/g)	5.500E+02	1.000E+02	---	DCNUCU(3,2)
R016	Unsaturated zone 3 (cm**3/g)	1.000E+02	1.000E+02	---	DCNUCU(3,3)
R016	Saturated zone (cm**3/g)	1.000E+02	1.000E+02	---	DCNUCS(3)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.363E-03	ALEACH(3)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(3)
R016	Distribution coefficients for Ra-226				
R016	Contaminated zone (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCC(4)
R016	Unsaturated zone 1 (cm**3/g)	5.000E+02	7.000E+01	---	DCNUCU(4,1)
R016	Unsaturated zone 2 (cm**3/g)	9.100E+03	7.000E+01	---	DCNUCU(4,2)
R016	Unsaturated zone 3 (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCU(4,3)
R016	Saturated zone (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCS(4)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.946E-03	ALEACH(4)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(4)
R016	Distribution coefficients for Ra-228				
R016	Contaminated zone (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCC(5)
R016	Unsaturated zone 1 (cm**3/g)	5.000E+02	7.000E+01	---	DCNUCU(5,1)
R016	Unsaturated zone 2 (cm**3/g)	9.100E+03	7.000E+01	---	DCNUCU(5,2)
R016	Unsaturated zone 3 (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCU(5,3)
R016	Saturated zone (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCS(5)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.946E-03	ALEACH(5)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(5)

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016	Distribution coefficients for Th-228				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(6)
R016	Unsaturated zone 1 (cm**3/g)	3.200E+03	6.000E+04	---	DCNUCU(6,1)
R016	Unsaturated zone 2 (cm**3/g)	5.800E+03	6.000E+04	---	DCNUCU(6,2)
R016	Unsaturated zone 3 (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCU(6,3)
R016	Saturated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCS(6)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.277E-06	ALEACH(6)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(6)
R016	Distribution coefficients for Th-230				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(7)
R016	Unsaturated zone 1 (cm**3/g)	3.200E+03	6.000E+04	---	DCNUCU(7,1)
R016	Unsaturated zone 2 (cm**3/g)	5.800E+03	6.000E+04	---	DCNUCU(7,2)
R016	Unsaturated zone 3 (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCU(7,3)
R016	Saturated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCS(7)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.277E-06	ALEACH(7)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(7)
R016	Distribution coefficients for Th-232				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(8)
R016	Unsaturated zone 1 (cm**3/g)	3.200E+03	6.000E+04	---	DCNUCU(8,1)
R016	Unsaturated zone 2 (cm**3/g)	5.800E+03	6.000E+04	---	DCNUCU(8,2)
R016	Unsaturated zone 3 (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCU(8,3)
R016	Saturated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCS(8)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.277E-06	ALEACH(8)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(8)
R016	Distribution coefficients for U-234				
R016	Contaminated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCC(9)
R016	Unsaturated zone 1 (cm**3/g)	3.500E+01	5.000E+01	---	DCNUCU(9,1)
R016	Unsaturated zone 2 (cm**3/g)	1.600E+03	5.000E+01	---	DCNUCU(9,2)
R016	Unsaturated zone 3 (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCU(9,3)
R016	Saturated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCS(9)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.721E-03	ALEACH(9)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(9)
R016	Distribution coefficients for U-235				
R016	Contaminated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCC(10)
R016	Unsaturated zone 1 (cm**3/g)	3.500E+01	5.000E+01	---	DCNUCU(10,1)
R016	Unsaturated zone 2 (cm**3/g)	1.600E+03	5.000E+01	---	DCNUCU(10,2)
R016	Unsaturated zone 3 (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCU(10,3)
R016	Saturated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCS(10)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.721E-03	ALEACH(10)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(10)

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016	Distribution coefficients for U-238				
R016	Contaminated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCC(11)
R016	Unsaturated zone 1 (cm**3/g)	3.500E+01	5.000E+01	---	DCNUCU(11,1)
R016	Unsaturated zone 2 (cm**3/g)	1.600E+03	5.000E+01	---	DCNUCU(11,2)
R016	Unsaturated zone 3 (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCU(11,3)
R016	Saturated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCS(11)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.721E-03	ALEACH(11)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(11)
R017	Inhalation rate (m**3/yr)	8.400E+03	8.400E+03	---	INHALR
R017	Mass loading for inhalation (g/m**3)	1.000E-04	1.000E-04	---	MLINH
R017	Exposure duration	3.000E+01	3.000E+01	---	ED
R017	Shielding factor, inhalation	4.000E-01	4.000E-01	---	SHF3
R017	Shielding factor, external gamma	7.000E-01	7.000E-01	---	SHF1
R017	Fraction of time spent indoors	5.000E-01	5.000E-01	---	FIND
R017	Fraction of time spent outdoors (on site)	2.500E-01	2.500E-01	---	FOTD
R017	Shape factor flag, external gamma	1.000E+00	1.000E+00	>0 shows circular AREA.	FS
R017	Radii of shape factor array (used if FS = -1):				
R017	Outer annular radius (m), ring 1:	not used	5.000E+01	---	RAD_SHAPE(1)
R017	Outer annular radius (m), ring 2:	not used	7.071E+01	---	RAD_SHAPE(2)
R017	Outer annular radius (m), ring 3:	not used	0.000E+00	---	RAD_SHAPE(3)
R017	Outer annular radius (m), ring 4:	not used	0.000E+00	---	RAD_SHAPE(4)
R017	Outer annular radius (m), ring 5:	not used	0.000E+00	---	RAD_SHAPE(5)
R017	Outer annular radius (m), ring 6:	not used	0.000E+00	---	RAD_SHAPE(6)
R017	Outer annular radius (m), ring 7:	not used	0.000E+00	---	RAD_SHAPE(7)
R017	Outer annular radius (m), ring 8:	not used	0.000E+00	---	RAD_SHAPE(8)
R017	Outer annular radius (m), ring 9:	not used	0.000E+00	---	RAD_SHAPE(9)
R017	Outer annular radius (m), ring 10:	not used	0.000E+00	---	RAD_SHAPE(10)
R017	Outer annular radius (m), ring 11:	not used	0.000E+00	---	RAD_SHAPE(11)
R017	Outer annular radius (m), ring 12:	not used	0.000E+00	---	RAD_SHAPE(12)
R017	Fractions of annular areas within AREA:				
R017	Ring 1	not used	1.000E+00	---	FRACA(1)
R017	Ring 2	not used	2.732E-01	---	FRACA(2)
R017	Ring 3	not used	0.000E+00	---	FRACA(3)
R017	Ring 4	not used	0.000E+00	---	FRACA(4)
R017	Ring 5	not used	0.000E+00	---	FRACA(5)
R017	Ring 6	not used	0.000E+00	---	FRACA(6)
R017	Ring 7	not used	0.000E+00	---	FRACA(7)
R017	Ring 8	not used	0.000E+00	---	FRACA(8)
R017	Ring 9	not used	0.000E+00	---	FRACA(9)
R017	Ring 10	not used	0.000E+00	---	FRACA(10)
R017	Ring 11	not used	0.000E+00	---	FRACA(11)
R017	Ring 12	not used	0.000E+00	---	FRACA(12)
R018	Fruits, vegetables and grain consumption (kg/yr)	1.600E+02	1.600E+02	---	DIET(1)
R018	Leafy vegetable consumption (kg/yr)	1.400E+01	1.400E+01	---	DIET(2)
R018	Milk consumption (L/yr)	9.200E+01	9.200E+01	---	DIET(3)
R018	Meat and poultry consumption (kg/yr)	6.300E+01	6.300E+01	---	DIET(4)
R018	Fish consumption (kg/yr)	5.400E+00	5.400E+00	---	DIET(5)

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R018	Other seafood consumption (kg/yr)	9.000E-01	9.000E-01	---	DIET(6)
R018	Soil ingestion rate (g/yr)	3.650E+01	3.650E+01	---	SOIL
R018	Drinking water intake (L/yr)	5.100E+02	5.100E+02	---	DWI
R018	Contamination fraction of drinking water	1.000E+00	1.000E+00	---	FDW
R018	Contamination fraction of household water	not used	1.000E+00	---	FHHW
R018	Contamination fraction of livestock water	1.000E+00	1.000E+00	---	FLW
R018	Contamination fraction of irrigation water	1.000E+00	1.000E+00	---	FIRW
R018	Contamination fraction of aquatic food	5.000E-01	5.000E-01	---	FR9
R018	Contamination fraction of plant food	5.000E-01	-1	---	FPLANT
R018	Contamination fraction of meat	1.000E+00	-1	---	FMEAT
R018	Contamination fraction of milk	1.000E+00	-1	---	FMILK
R019	Livestock fodder intake for meat (kg/day)	6.800E+01	6.800E+01	---	LFI5
R019	Livestock fodder intake for milk (kg/day)	5.500E+01	5.500E+01	---	LFI6
R019	Livestock water intake for meat (L/day)	5.000E+01	5.000E+01	---	LWI5
R019	Livestock water intake for milk (L/day)	1.600E+02	1.600E+02	---	LWI6
R019	Livestock soil intake (kg/day)	5.000E-01	5.000E-01	---	LSI
R019	Mass loading for foliar deposition (g/m**3)	1.000E-04	1.000E-04	---	MLFD
R019	Depth of soil mixing layer (m)	1.500E-01	1.500E-01	---	DM
R019	Depth of roots (m)	9.000E-01	9.000E-01	---	DROOT
R019	Drinking water fraction from ground water	1.000E+00	1.000E+00	---	FGWDW
R019	Household water fraction from ground water	not used	1.000E+00	---	FGWHH
R019	Livestock water fraction from ground water	1.000E+00	1.000E+00	---	FGWLW
R019	Irrigation fraction from ground water	1.000E+00	1.000E+00	---	FGWIR
R19B	Wet weight crop yield for Non-Leafy (kg/m**2)	7.000E-01	7.000E-01	---	YV(1)
R19B	Wet weight crop yield for Leafy (kg/m**2)	1.500E+00	1.500E+00	---	YV(2)
R19B	Wet weight crop yield for Fodder (kg/m**2)	1.100E+00	1.100E+00	---	YV(3)
R19B	Growing Season for Non-Leafy (years)	1.700E-01	1.700E-01	---	TE(1)
R19B	Growing Season for Leafy (years)	2.500E-01	2.500E-01	---	TE(2)
R19B	Growing Season for Fodder (years)	8.000E-02	8.000E-02	---	TE(3)
R19B	Translocation Factor for Non-Leafy	1.000E-01	1.000E-01	---	TIV(1)
R19B	Translocation Factor for Leafy	1.000E+00	1.000E+00	---	TIV(2)
R19B	Translocation Factor for Fodder	1.000E+00	1.000E+00	---	TIV(3)
R19B	Dry Foliar Interception Fraction for Non-Leafy	2.500E-01	2.500E-01	---	RDRY(1)
R19B	Dry Foliar Interception Fraction for Leafy	2.500E-01	2.500E-01	---	RDRY(2)
R19B	Dry Foliar Interception Fraction for Fodder	2.500E-01	2.500E-01	---	RDRY(3)
R19B	Wet Foliar Interception Fraction for Non-Leafy	2.500E-01	2.500E-01	---	RWET(1)
R19B	Wet Foliar Interception Fraction for Leafy	2.500E-01	2.500E-01	---	RWET(2)
R19B	Wet Foliar Interception Fraction for Fodder	2.500E-01	2.500E-01	---	RWET(3)
R19B	Weathering Removal Constant for Vegetation	2.000E+01	2.000E+01	---	WLAM
C14	C-12 concentration in water (g/cm**3)	not used	2.000E-05	---	C12WTR
C14	C-12 concentration in contaminated soil (g/g)	not used	3.000E-02	---	C12CZ
C14	Fraction of vegetation carbon from soil	not used	2.000E-02	---	CSOIL
C14	Fraction of vegetation carbon from air	not used	9.800E-01	---	CAIR
C14	C-14 evasion layer thickness in soil (m)	not used	3.000E-01	---	DMC
C14	C-14 evasion flux rate from soil (1/sec)	not used	7.000E-07	---	EVSN
C14	C-12 evasion flux rate from soil (1/sec)	not used	1.000E-10	---	REVSN
C14	Fraction of grain in beef cattle feed	not used	8.000E-01	---	AVFG4

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
C14	Fraction of grain in milk cow feed	not used	2.000E-01	---	AVFG5
C14	DCF correction factor for gaseous forms of C14	not used	0.000E+00	---	CO2F
STOR	Storage times of contaminated foodstuffs (days):				
STOR	Fruits, non-leafy vegetables, and grain	1.400E+01	1.400E+01	---	STOR_T(1)
STOR	Leafy vegetables	1.000E+00	1.000E+00	---	STOR_T(2)
STOR	Milk	1.000E+00	1.000E+00	---	STOR_T(3)
STOR	Meat and poultry	2.000E+01	2.000E+01	---	STOR_T(4)
STOR	Fish	7.000E+00	7.000E+00	---	STOR_T(5)
STOR	Crustacea and mollusks	7.000E+00	7.000E+00	---	STOR_T(6)
STOR	Well water	1.000E+00	1.000E+00	---	STOR_T(7)
STOR	Surface water	1.000E+00	1.000E+00	---	STOR_T(8)
STOR	Livestock fodder	4.500E+01	4.500E+01	---	STOR_T(9)
R021	Thickness of building foundation (m)	not used	1.500E-01	---	FLOOR1
R021	Bulk density of building foundation (g/cm**3)	not used	2.400E+00	---	DENSFL
R021	Total porosity of the cover material	not used	4.000E-01	---	TPCV
R021	Total porosity of the building foundation	not used	1.000E-01	---	TPFL
R021	Volumetric water content of the cover material	not used	5.000E-02	---	PH2OCV
R021	Volumetric water content of the foundation	not used	3.000E-02	---	PH2OFL
R021	Diffusion coefficient for radon gas (m/sec):				
R021	in cover material	not used	2.000E-06	---	DIFCV
R021	in foundation material	not used	3.000E-07	---	DIFFL
R021	in contaminated zone soil	not used	2.000E-06	---	DIFCZ
R021	Radon vertical dimension of mixing (m)	not used	2.000E+00	---	HMIX
R021	Average building air exchange rate (1/hr)	not used	5.000E-01	---	REXG
R021	Height of the building (room) (m)	not used	2.500E+00	---	HRM
R021	Building interior area factor	not used	0.000E+00	---	FAI
R021	Building depth below ground surface (m)	not used	-1.000E+00	---	DMFL
R021	Emanating power of Rn-222 gas	not used	2.500E-01	---	EMANA(1)
R021	Emanating power of Rn-220 gas	not used	1.500E-01	---	EMANA(2)
TITL	Number of graphical time points	32	---	---	NPTS
TITL	Maximum number of integration points for dose	17	---	---	LYMAX
TITL	Maximum number of integration points for risk	257	---	---	KYMAX

Summary of Pathway Selections

Pathway	User Selection
1 -- external gamma	active
2 -- inhalation (w/o radon)	active
3 -- plant ingestion	active
4 -- meat ingestion	active
5 -- milk ingestion	active
6 -- aquatic foods	active
7 -- drinking water	active
8 -- soil ingestion	active
9 -- radon	suppressed
Find peak pathway doses	active

Summary : Li Tungsten Dickson Warehouse Waste
File : Li Tungsten Dickson Warehouse Waste.RAD

Contaminated Zone Dimensions	
Area:	3716.00 square meters
Thickness:	2.44 meters
Cover Depth:	0.92 meters

Initial Soil Concentrations, pCi/g	
Ac-227	1.930E-02
Pa-231	1.930E-02
Pb-210	2.480E-01
Ra-226	4.170E-01
Ra-228	1.190E-01
Th-228	1.190E-01
Th-230	2.480E-01
Th-232	1.190E-01
U-234	2.480E-01
U-235	1.930E-02
U-238	2.480E-01

Total Dose TDOSE(t), mrem/yr
Basic Radiation Dose Limit = 2.500E+01 mrem/yr
Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

t (years):	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
TDOSE(t):	1.754E-04	1.770E-04	1.801E-04	1.916E-04	8.993E-02	4.689E-01	1.128E+00	3.949E+00
M(t):	7.015E-06	7.079E-06	7.205E-06	7.666E-06	3.597E-03	1.876E-02	4.511E-02	1.580E-01

Maximum TDOSE(t): 3.949E+00 mrem/yr at t = 1.000E+03 years

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	8.242E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pa-231	3.840E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pb-210	3.633E-11	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	7.623E-05	0.4347	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-228	1.880E-05	0.1072	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	7.938E-05	0.4526	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	9.843E-09	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-232	8.690E-07	0.0050	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-234	2.967E-14	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-235	4.675E-11	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	7.578E-08	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	1.754E-04	1.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.242E-09	0.0000
Pa-231	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.840E-10	0.0000
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.633E-11	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.623E-05	0.4347
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.880E-05	0.1072
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.938E-05	0.4526
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.843E-09	0.0001
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.690E-07	0.0050
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.967E-14	0.0000
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.675E-11	0.0000
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.578E-08	0.0004
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.754E-04	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	8.049E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pa-231	6.502E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pb-210	3.568E-11	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	7.691E-05	0.4346	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-228	3.964E-05	0.2240	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	5.578E-05	0.3152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	2.979E-08	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-232	4.526E-06	0.0256	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-234	2.087E-13	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-235	4.761E-11	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	7.660E-08	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	1.770E-04	1.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.049E-09	0.0000
Pa-231	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.502E-10	0.0000
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.568E-11	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.691E-05	0.4346
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.964E-05	0.2240
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.578E-05	0.3152
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.979E-08	0.0002
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.526E-06	0.0256
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.087E-13	0.0000
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.761E-11	0.0000
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.660E-08	0.0004
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.770E-04	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	7.678E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pa-231	1.174E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pb-210	3.443E-11	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	7.829E-05	0.4346	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-228	5.725E-05	0.3178	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	2.754E-05	0.1529	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	7.091E-08	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-232	1.689E-05	0.0938	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-234	1.123E-12	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-235	4.939E-11	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	7.826E-08	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	1.801E-04	1.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.678E-09	0.0000
Pa-231	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.174E-09	0.0000
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.443E-11	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.829E-05	0.4346
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.725E-05	0.3178
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.754E-05	0.1529
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.091E-08	0.0004
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.689E-05	0.0938
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.123E-12	0.0000
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.939E-11	0.0000
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.826E-08	0.0004
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.801E-04	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+01 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	6.510E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pa-231	2.934E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pb-210	3.036E-11	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	8.331E-05	0.4347	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-228	4.132E-05	0.2156	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	2.330E-06	0.0122	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	2.282E-07	0.0012	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-232	6.436E-05	0.3358	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-234	1.074E-11	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-235	5.633E-11	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	8.438E-08	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	1.916E-04	1.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+01 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.510E-09	0.0000
Pa-231	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.934E-09	0.0000
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.036E-11	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.331E-05	0.4347
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.132E-05	0.2156
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.330E-06	0.0122
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.282E-07	0.0012
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.436E-05	0.3358
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.074E-11	0.0000
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.633E-11	0.0000
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.438E-08	0.0004
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.916E-04	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+01 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	4.063E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.289E-04	0.0037	3.213E-07	0.0000	3.806E-07	0.0000	0.000E+00	0.0000
Pa-231	7.551E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.396E-03	0.0378	6.887E-04	0.0077	1.498E-06	0.0000	0.000E+00	0.0000
Pb-210	2.124E-11	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.003E-02	0.1115	3.914E-04	0.0044	1.739E-04	0.0019	0.000E+00	0.0000
Ra-226	9.949E-05	0.0011	0.000E+00	0.0000	0.000E+00	0.0000	5.695E-02	0.6333	2.547E-03	0.0283	2.235E-03	0.0249	0.000E+00	0.0000
Ra-228	4.683E-06	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	2.516E-04	0.0028	1.213E-05	0.0001	1.416E-05	0.0002	0.000E+00	0.0000
Th-228	2.007E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.292E-09	0.0000	1.118E-11	0.0000	6.625E-13	0.0000	0.000E+00	0.0000
Th-230	8.108E-07	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.751E-04	0.0064	1.809E-05	0.0002	1.662E-05	0.0002	0.000E+00	0.0000
Th-232	1.254E-04	0.0014	0.000E+00	0.0000	0.000E+00	0.0000	1.051E-02	0.1168	4.800E-04	0.0053	5.620E-04	0.0062	0.000E+00	0.0000
U-234	1.096E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.415E-04	0.0027	4.008E-06	0.0000	8.379E-06	0.0001	0.000E+00	0.0000
U-235	8.314E-11	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.979E-05	0.0002	7.369E-07	0.0000	6.167E-07	0.0000	0.000E+00	0.0000
U-238	1.046E-07	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.293E-04	0.0025	3.804E-06	0.0000	7.955E-06	0.0001	0.000E+00	0.0000
Total	2.306E-04	0.0026	0.000E+00	0.0000	0.000E+00	0.0000	8.253E-02	0.9177	4.146E-03	0.0461	3.020E-03	0.0336	0.000E+00	0.0000

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+01 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.296E-04	0.0037
Pa-231	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.087E-03	0.0454
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.059E-02	0.1178
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.184E-02	0.6876
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.826E-04	0.0031
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.310E-09	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.106E-04	0.0068
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.167E-02	0.1298
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.539E-04	0.0028
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.114E-05	0.0002
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.411E-04	0.0027
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.993E-02	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	7.845E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.220E-04	0.0003	1.201E-07	0.0000	1.419E-07	0.0000	0.000E+00	0.0000
Pa-231	2.597E-08	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.672E-02	0.0356	3.167E-03	0.0068	8.288E-06	0.0000	0.000E+00	0.0000
Pb-210	6.208E-12	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.719E-03	0.0122	2.249E-04	0.0005	9.969E-05	0.0002	0.000E+00	0.0000
Ra-226	1.852E-04	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	3.381E-01	0.7210	1.482E-02	0.0316	1.176E-02	0.0251	0.000E+00	0.0000
Ra-228	1.731E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.628E-07	0.0000	1.276E-08	0.0000	1.486E-08	0.0000	0.000E+00	0.0000
Th-228	3.766E-20	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.226E-19	0.0000	6.028E-22	0.0000	3.562E-23	0.0000	0.000E+00	0.0000
Th-230	5.415E-06	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.317E-03	0.0199	3.721E-04	0.0008	3.142E-04	0.0007	0.000E+00	0.0000
Th-232	2.553E-04	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	5.942E-02	0.1267	2.739E-03	0.0058	3.197E-03	0.0068	0.000E+00	0.0000
U-234	2.326E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.107E-03	0.0024	1.858E-05	0.0000	3.857E-05	0.0001	0.000E+00	0.0000
U-235	3.243E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.146E-04	0.0002	8.085E-06	0.0000	2.843E-06	0.0000	0.000E+00	0.0000
U-238	2.222E-07	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.048E-03	0.0022	1.752E-05	0.0000	3.652E-05	0.0001	0.000E+00	0.0000
Total	4.462E-04	0.0010	0.000E+00	0.0000	0.000E+00	0.0000	4.317E-01	0.9205	2.137E-02	0.0456	1.545E-02	0.0330	0.000E+00	0.0000

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+02 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.223E-04	0.0003
Pa-231	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.989E-02	0.0424
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.043E-03	0.0129
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.649E-01	0.7781
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.921E-07	0.0000
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.609E-19	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.001E-02	0.0213
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.561E-02	0.1399
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.164E-03	0.0025
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.255E-04	0.0003
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.102E-03	0.0023
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.689E-01	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	7.530E-12	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.811E-07	0.0000	1.785E-10	0.0000	2.107E-10	0.0000	0.000E+00	0.0000
Pa-231	3.396E-07	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.248E-02	0.0288	6.120E-03	0.0054	1.625E-05	0.0000	0.000E+00	0.0000
Pb-210	2.337E-13	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.903E-05	0.0000	1.143E-06	0.0000	5.064E-07	0.0000	0.000E+00	0.0000
Ra-226	1.096E-03	0.0010	0.000E+00	0.0000	0.000E+00	0.0000	7.223E-01	0.6404	3.162E-02	0.0280	2.478E-02	0.0220	0.000E+00	0.0000
Ra-228	2.736E-19	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.013E-17	0.0000	9.787E-19	0.0000	1.139E-18	0.0000	0.000E+00	0.0000
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	1.236E-04	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	7.839E-02	0.0695	3.315E-03	0.0029	2.676E-03	0.0024	0.000E+00	0.0000
Th-232	1.785E-03	0.0016	0.000E+00	0.0000	0.000E+00	0.0000	1.984E-01	0.1759	9.155E-03	0.0081	1.068E-02	0.0095	0.000E+00	0.0000
U-234	1.429E-07	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.225E-03	0.0020	3.945E-05	0.0000	7.756E-05	0.0001	0.000E+00	0.0000
U-235	1.226E-08	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.598E-04	0.0003	4.164E-05	0.0000	5.583E-06	0.0000	0.000E+00	0.0000
U-238	1.912E-06	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.032E-03	0.0018	3.401E-05	0.0000	7.090E-05	0.0001	0.000E+00	0.0000
Total	3.007E-03	0.0027	0.000E+00	0.0000	0.000E+00	0.0000	1.036E+00	0.9188	5.032E-02	0.0446	3.831E-02	0.0340	0.000E+00	0.0000

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+02 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.815E-07	0.0000
Pa-231	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.861E-02	0.0342
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.068E-05	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.798E-01	0.6914
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.252E-17	0.0000
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.451E-02	0.0749
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.200E-01	0.1951
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.343E-03	0.0021
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.070E-04	0.0004
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.139E-03	0.0019
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.128E+00	1.0000

*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+03 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	3.673E-19	0.0000	1.276E-19	0.0000	0.000E+00	0.0000	1.057E-18	0.0000	4.105E-21	0.0000	5.702E-21	0.0000	1.330E-19	0.0000
Pa-231	1.365E-03	0.0003	5.206E-04	0.0001	0.000E+00	0.0000	1.503E-02	0.0038	4.923E-03	0.0012	2.557E-05	0.0000	8.073E-04	0.0002
Pb-210	6.791E-18	0.0000	2.652E-18	0.0000	0.000E+00	0.0000	1.253E-14	0.0000	8.565E-16	0.0000	4.173E-16	0.0000	3.941E-16	0.0000
Ra-226	2.383E-01	0.0603	7.265E-05	0.0000	0.000E+00	0.0000	4.308E-01	0.1091	2.780E-02	0.0070	2.114E-02	0.0054	9.342E-03	0.0024
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	2.513E-01	0.0636	4.692E-03	0.0012	0.000E+00	0.0000	4.443E-01	0.1125	2.830E-02	0.0072	2.159E-02	0.0055	1.285E-02	0.0033
Th-232	1.045E+00	0.2646	1.362E-02	0.0034	0.000E+00	0.0000	6.245E-01	0.1581	3.548E-02	0.0090	4.149E-02	0.0105	1.607E-02	0.0041
U-234	6.653E-04	0.0002	1.385E-04	0.0000	0.000E+00	0.0000	2.167E-03	0.0005	1.402E-04	0.0000	2.185E-04	0.0001	1.612E-04	0.0000
U-235	5.671E-04	0.0001	1.990E-05	0.0000	0.000E+00	0.0000	3.931E-04	0.0001	1.102E-04	0.0000	1.248E-05	0.0000	2.629E-05	0.0000
U-238	1.369E-03	0.0003	1.116E-04	0.0000	0.000E+00	0.0000	9.571E-04	0.0002	6.316E-05	0.0000	1.547E-04	0.0000	1.203E-04	0.0000
Total	1.538E+00	0.3895	1.917E-02	0.0049	0.000E+00	0.0000	1.518E+00	0.3844	9.682E-02	0.0245	8.463E-02	0.0214	3.938E-02	0.0100

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+03 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.695E-18	0.0000
Pa-231	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.267E-02	0.0057
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.420E-14	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.275E-01	0.1842
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.630E-01	0.1932
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.776E+00	0.4497
U-234	2.797E-01	0.0708	1.193E-04	0.0000	0.000E+00	0.0000	2.152E-02	0.0054	2.055E-03	0.0005	7.849E-03	0.0020	3.148E-01	0.0797
U-235	4.141E-02	0.0105	6.279E-05	0.0000	0.000E+00	0.0000	3.186E-03	0.0008	8.662E-04	0.0002	5.911E-04	0.0001	4.724E-02	0.0120
U-238	2.655E-01	0.0672	1.045E-04	0.0000	0.000E+00	0.0000	2.042E-02	0.0052	1.933E-03	0.0005	7.464E-03	0.0019	2.982E-01	0.0755
Total	5.866E-01	0.1485	2.865E-04	0.0001	0.000E+00	0.0000	4.513E-02	0.0114	4.854E-03	0.0012	1.590E-02	0.0040	3.949E+00	1.0000

*Sum of all water independent and dependent pathways.

Dose/Source Ratios Summed Over All Pathways
Parent and Progeny Principal Radionuclide Contributions Indicated

Parent (i)	Product (j)	Thread Fraction	DSR(j,t) At Time in Years (mrem/yr)/(pCi/g) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ac-227+D	Ac-227+D	1.000E+00	4.270E-07	4.171E-07	3.978E-07	3.373E-07	1.708E-02	6.335E-03	9.405E-06	8.782E-17
Pa-231	Pa-231	1.000E+00	1.304E-08	1.324E-08	1.363E-08	1.510E-08	1.814E-01	8.286E-01	1.600E+00	8.781E-01
Pa-231	Ac-227+D	1.000E+00	6.852E-09	2.045E-08	4.722E-08	1.369E-07	3.037E-02	2.021E-01	4.009E-01	2.964E-01
Pa-231	∑DSR(j)		1.990E-08	3.369E-08	6.085E-08	1.520E-07	2.117E-01	1.031E+00	2.001E+00	1.174E+00
Pb-210+D	Pb-210+D	1.000E+00	1.465E-10	1.439E-10	1.388E-10	1.224E-10	4.271E-02	2.437E-02	1.237E-04	5.727E-14
Ra-226+D	Ra-226+D	1.000E+00	1.828E-04	1.844E-04	1.877E-04	1.998E-04	8.153E-02	3.810E-01	7.926E-01	1.055E+00
Ra-226+D	Pb-210+D	1.000E+00	2.293E-12	6.861E-12	1.592E-11	4.698E-11	6.676E-02	4.939E-01	1.077E+00	6.893E-01
Ra-226+D	∑DSR(j)		1.828E-04	1.844E-04	1.877E-04	1.998E-04	1.483E-01	8.749E-01	1.870E+00	1.745E+00
Ra-228+D	Ra-228+D	1.000E+00	3.489E-05	3.125E-05	2.508E-05	1.161E-05	2.277E-03	2.379E-06	1.823E-16	0.000E+00
Ra-228+D	Th-228+D	1.000E+00	1.231E-04	3.019E-04	4.560E-04	3.356E-04	9.762E-05	7.620E-08	6.905E-18	0.000E+00
Ra-228+D	∑DSR(j)		1.580E-04	3.331E-04	4.811E-04	3.472E-04	2.375E-03	2.455E-06	1.892E-16	0.000E+00
Th-228+D	Th-228+D	1.000E+00	6.670E-04	4.687E-04	2.314E-04	1.958E-05	3.622E-08	1.352E-18	0.000E+00	0.000E+00
Th-230	Th-230	1.000E+00	4.530E-15	4.658E-15	4.927E-15	5.995E-15	8.232E-04	4.546E-03	1.515E-02	8.341E-02
Th-230	Ra-226+D	1.000E+00	3.969E-08	1.201E-07	2.859E-07	9.202E-07	1.116E-03	1.872E-02	1.504E-01	1.870E+00
Th-230	Pb-210+D	1.000E+00	3.325E-16	2.333E-15	1.240E-14	1.135E-13	5.235E-04	1.709E-02	1.752E-01	1.124E+00
Th-230	∑DSR(j)		3.969E-08	1.201E-07	2.859E-07	9.202E-07	2.462E-03	4.036E-02	3.408E-01	3.077E+00
Th-232	Th-232	1.000E+00	1.035E-16	1.068E-16	1.136E-16	1.414E-16	4.102E-03	2.267E-02	7.567E-02	4.171E-01
Th-232	Ra-228+D	1.000E+00	2.150E-06	6.185E-06	1.319E-05	2.990E-05	9.121E-02	5.165E-01	1.726E+00	8.815E+00
Th-232	Th-228+D	1.000E+00	5.152E-06	3.185E-05	1.288E-04	5.109E-04	2.788E-03	1.221E-02	4.750E-02	5.692E+00
Th-232	∑DSR(j)		7.302E-06	3.803E-05	1.420E-04	5.408E-04	9.810E-02	5.514E-01	1.849E+00	1.492E+01
U-234	U-234	1.000E+00	4.821E-16	4.949E-16	5.218E-16	6.276E-16	1.023E-03	4.675E-03	9.058E-03	1.253E+00
U-234	Th-230	1.000E+00	2.046E-20	6.287E-20	1.546E-19	5.588E-19	2.173E-07	3.601E-06	2.803E-05	2.662E-04
U-234	Ra-226+D	1.000E+00	1.191E-13	8.409E-13	4.528E-12	4.329E-11	1.506E-07	8.038E-06	1.738E-04	6.165E-03
U-234	Pb-210+D	1.000E+00	7.496E-22	1.129E-20	1.331E-19	3.663E-18	5.107E-08	5.941E-06	1.862E-04	9.697E-03
U-234	∑DSR(j)		1.196E-13	8.414E-13	4.528E-12	4.329E-11	1.024E-03	4.693E-03	9.446E-03	1.269E+00
U-235+D	U-235+D	1.000E+00	2.422E-09	2.466E-09	2.556E-09	2.899E-09	9.668E-04	4.418E-03	8.565E-03	1.215E+00
U-235+D	Pa-231	1.000E+00	1.383E-13	4.204E-13	1.010E-12	3.356E-12	1.169E-04	1.763E-03	1.020E-02	4.254E-01
U-235+D	Ac-227+D	1.000E+00	4.852E-14	3.398E-13	1.798E-12	1.617E-11	1.162E-05	3.234E-04	2.321E-03	8.072E-01
U-235+D	∑DSR(j)		2.422E-09	2.467E-09	2.559E-09	2.919E-09	1.095E-03	6.504E-03	2.109E-02	2.448E+00
U-238	U-238	5.400E-05	3.200E-35	3.404E-35	3.852E-35	5.936E-35	4.980E-08	2.276E-07	4.411E-07	6.115E-05
U-238+D	U-238+D	9.999E-01	3.056E-07	3.089E-07	3.156E-07	3.403E-07	9.721E-04	4.441E-03	8.615E-03	1.199E+00
U-238+D	U-234	9.999E-01	6.863E-22	2.108E-21	5.180E-21	1.868E-20	8.850E-08	1.332E-06	7.720E-06	3.559E-03
U-238+D	Th-230	9.999E-01	1.937E-26	1.387E-25	7.714E-25	8.285E-24	9.285E-12	4.901E-10	1.034E-08	2.353E-07
U-238+D	Ra-226+D	9.999E-01	8.446E-20	1.277E-18	1.517E-17	4.291E-16	4.302E-12	7.434E-10	4.549E-08	5.479E-06
U-238+D	Pb-210+D	9.999E-01	4.256E-28	1.327E-26	3.384E-25	2.769E-23	1.150E-12	4.632E-10	4.491E-08	1.283E-05
U-238+D	∑DSR(j)		3.056E-07	3.089E-07	3.156E-07	3.403E-07	9.722E-04	4.442E-03	8.623E-03	1.202E+00

The DSR includes contributions from associated (half-life ≤ 180 days) daughters.

Single Radionuclide Soil Guidelines G(i,t) in pCi/g
Basic Radiation Dose Limit = 2.500E+01 mrem/yr

Nuclide (i)	t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ac-227	5.854E+07	5.994E+07	6.284E+07	7.412E+07	1.464E+03	3.946E+03	2.658E+06	*7.232E+13
Pa-231	1.257E+09	7.420E+08	4.108E+08	1.645E+08	1.181E+02	2.426E+01	1.250E+01	2.129E+01
Pb-210	1.706E+11	1.737E+11	1.801E+11	2.042E+11	5.853E+02	1.026E+03	2.021E+05	*7.634E+13
Ra-226	1.368E+05	1.355E+05	1.332E+05	1.251E+05	1.686E+02	2.857E+01	1.337E+01	1.433E+01
Ra-228	1.582E+05	7.505E+04	5.197E+04	7.200E+04	1.053E+04	1.018E+07	*2.726E+14	*2.726E+14
Th-228	3.748E+04	5.334E+04	1.080E+05	1.277E+06	6.902E+08	*8.195E+14	*8.195E+14	*8.195E+14
Th-230	6.299E+08	2.081E+08	8.744E+07	2.717E+07	1.015E+04	6.195E+02	7.336E+01	8.126E+00
Th-232	*1.097E+05	*1.097E+05	*1.097E+05	4.623E+04	2.548E+02	4.534E+01	1.352E+01	1.675E+00
U-234	*6.247E+09	*6.247E+09	*6.247E+09	*6.247E+09	2.442E+04	5.327E+03	2.647E+03	1.970E+01
U-235	*2.161E+06	*2.161E+06	*2.161E+06	*2.161E+06	2.282E+04	3.844E+03	1.186E+03	1.021E+01
U-238	*3.361E+05	*3.361E+05	*3.361E+05	*3.361E+05	2.571E+04	5.627E+03	2.899E+03	2.079E+01

*At specific activity limit

Summed Dose/Source Ratios DSR(i,t) in (mrem/yr)/(pCi/g)
and Single Radionuclide Soil Guidelines G(i,t) in pCi/g
at tmin = time of minimum single radionuclide soil quideline
and at tmax = time of maximum total dose = 1.000E+03 years

Nuclide (i)	Initial (pCi/g)	tmin (years)	DSR(i,tmin)	G(i,tmin) (pCi/g)	DSR(i,tmax)	G(i,tmax) (pCi/g)
Ac-227	1.930E-02	40.47 ± 0.08	1.912E-02	1.307E+03	8.782E-17	*7.232E+13
Pa-231	1.930E-02	379.1 ± 0.8	2.057E+00	1.215E+01	1.174E+00	2.129E+01
Pb-210	2.480E-01	45.36 ± 0.09	5.174E-02	4.832E+02	5.727E-14	*7.634E+13
Ra-226	4.170E-01	442.7 ± 0.9	2.004E+00	1.247E+01	1.745E+00	1.433E+01
Ra-228	1.190E-01	22.50 ± 0.05	3.102E-03	8.060E+03	0.000E+00	*2.726E+14
Th-228	1.190E-01	0.000E+00	6.670E-04	3.748E+04	0.000E+00	*8.195E+14
Th-230	2.480E-01	1.000E+03	3.077E+00	8.126E+00	3.077E+00	8.126E+00
Th-232	1.190E-01	1.000E+03	1.492E+01	1.675E+00	1.492E+01	1.675E+00
U-234	2.480E-01	1.000E+03	1.269E+00	1.970E+01	1.269E+00	1.970E+01
U-235	1.930E-02	1.000E+03	2.448E+00	1.021E+01	2.448E+00	1.021E+01
U-238	2.480E-01	1.000E+03	1.202E+00	2.079E+01	1.202E+00	2.079E+01

*At specific activity limit

Individual Nuclide Dose Summed Over All Pathways
Parent Nuclide and Branch Fraction Indicated

Nuclide (j)	Parent (i)	THF(i)	DOSE(j,t), mrem/yr t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ac-227	Ac-227	1.000E+00	8.242E-09	8.049E-09	7.678E-09	6.510E-09	3.296E-04	1.223E-04	1.815E-07	1.695E-18
Ac-227	Pa-231	1.000E+00	1.322E-10	3.948E-10	9.114E-10	2.642E-09	5.861E-04	3.900E-03	7.738E-03	5.721E-03
Ac-227	U-235	1.000E+00	9.364E-16	6.557E-15	3.469E-14	3.121E-13	2.243E-07	6.241E-06	4.479E-05	1.558E-02
Ac-227	∑DOSE(j)		8.374E-09	8.444E-09	8.590E-09	9.152E-09	9.159E-04	4.029E-03	7.783E-03	2.130E-02
Pa-231	Pa-231	1.000E+00	2.517E-10	2.555E-10	2.631E-10	2.915E-10	3.500E-03	1.599E-02	3.087E-02	1.695E-02
Pa-231	U-235	1.000E+00	2.670E-15	8.114E-15	1.949E-14	6.477E-14	2.256E-06	3.402E-05	1.969E-04	8.210E-03
Pa-231	∑DOSE(j)		2.517E-10	2.555E-10	2.631E-10	2.915E-10	3.503E-03	1.603E-02	3.107E-02	2.516E-02
Pb-210	Pb-210	1.000E+00	3.633E-11	3.568E-11	3.443E-11	3.036E-11	1.059E-02	6.043E-03	3.068E-05	1.420E-14
Pb-210	Ra-226	1.000E+00	9.561E-13	2.861E-12	6.640E-12	1.959E-11	2.784E-02	2.060E-01	4.493E-01	2.875E-01
Pb-210	Th-230	1.000E+00	8.245E-17	5.786E-16	3.076E-15	2.815E-14	1.298E-04	4.239E-03	4.346E-02	2.786E-01
Pb-210	U-234	1.000E+00	1.859E-22	2.801E-21	3.300E-20	9.085E-19	1.267E-08	1.473E-06	4.618E-05	2.405E-03
Pb-210	U-238	9.999E-01	1.056E-28	3.290E-27	8.391E-26	6.868E-24	2.851E-13	1.149E-10	1.114E-08	3.182E-06
Pb-210	∑DOSE(j)		3.729E-11	3.855E-11	4.107E-11	4.998E-11	3.856E-02	2.162E-01	4.928E-01	5.685E-01
Ra-226	Ra-226	1.000E+00	7.623E-05	7.691E-05	7.829E-05	8.331E-05	3.400E-02	1.589E-01	3.305E-01	4.400E-01
Ra-226	Th-230	1.000E+00	9.843E-09	2.979E-08	7.091E-08	2.282E-07	2.767E-04	4.643E-03	3.729E-02	4.637E-01
Ra-226	U-234	1.000E+00	2.955E-14	2.085E-13	1.123E-12	1.074E-11	3.735E-08	1.993E-06	4.309E-05	1.529E-03
Ra-226	U-238	9.999E-01	2.095E-20	3.167E-19	3.761E-18	1.064E-16	1.067E-12	1.844E-10	1.128E-08	1.359E-06
Ra-226	∑DOSE(j)		7.624E-05	7.694E-05	7.836E-05	8.354E-05	3.428E-02	1.635E-01	3.679E-01	9.052E-01
Ra-228	Ra-228	1.000E+00	4.152E-06	3.719E-06	2.984E-06	1.381E-06	2.710E-04	2.831E-07	2.170E-17	0.000E+00
Ra-228	Th-232	1.000E+00	2.559E-07	7.360E-07	1.570E-06	3.558E-06	1.085E-02	6.146E-02	2.054E-01	1.049E+00
Ra-228	∑DOSE(j)		4.407E-06	4.455E-06	4.554E-06	4.939E-06	1.112E-02	6.146E-02	2.054E-01	1.049E+00
Th-228	Ra-228	1.000E+00	1.465E-05	3.592E-05	5.426E-05	3.994E-05	1.162E-05	9.067E-09	8.217E-19	0.000E+00
Th-228	Th-228	1.000E+00	7.938E-05	5.578E-05	2.754E-05	2.330E-06	4.310E-09	1.609E-19	0.000E+00	0.000E+00
Th-228	Th-232	1.000E+00	6.131E-07	3.790E-06	1.532E-05	6.080E-05	3.317E-04	1.453E-03	5.652E-03	6.774E-01
Th-228	∑DOSE(j)		9.464E-05	9.549E-05	9.713E-05	1.031E-04	3.433E-04	1.453E-03	5.652E-03	6.774E-01
Th-230	Th-230	1.000E+00	1.123E-15	1.155E-15	1.222E-15	1.487E-15	2.041E-04	1.127E-03	3.757E-03	2.068E-02
Th-230	U-234	1.000E+00	5.075E-21	1.559E-20	3.834E-20	1.386E-19	5.390E-08	8.932E-07	6.951E-06	6.601E-05
Th-230	U-238	9.999E-01	4.805E-27	3.440E-26	1.913E-25	2.055E-24	2.303E-12	1.215E-10	2.564E-09	5.835E-08
Th-230	∑DOSE(j)		1.123E-15	1.155E-15	1.222E-15	1.487E-15	2.042E-04	1.128E-03	3.764E-03	2.075E-02
Th-232	Th-232	1.000E+00	1.231E-17	1.270E-17	1.352E-17	1.682E-17	4.881E-04	2.697E-03	9.005E-03	4.963E-02
U-234	U-234	1.000E+00	1.196E-16	1.227E-16	1.294E-16	1.556E-16	2.538E-04	1.159E-03	2.246E-03	3.108E-01
U-234	U-238	9.999E-01	1.702E-22	5.227E-22	1.285E-21	4.634E-21	2.195E-08	3.304E-07	1.914E-06	8.827E-04
U-234	∑DOSE(j)		1.196E-16	1.227E-16	1.294E-16	1.556E-16	2.538E-04	1.160E-03	2.248E-03	3.117E-01
U-235	U-235	1.000E+00	4.674E-11	4.759E-11	4.933E-11	5.595E-11	1.866E-05	8.527E-05	1.653E-04	2.345E-02
U-238	U-238	5.400E-05	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.235E-08	5.643E-08	1.094E-07	1.516E-05
U-238	U-238	9.999E-01	7.578E-08	7.660E-08	7.826E-08	8.438E-08	2.411E-04	1.101E-03	2.137E-03	2.973E-01
U-238	∑DOSE(j)		7.578E-08	7.660E-08	7.826E-08	8.438E-08	2.411E-04	1.101E-03	2.137E-03	2.973E-01

THF(i) is the thread fraction of the parent nuclide.

Summary : Li Tungsten Dickson Warehouse Waste
File : Li Tungsten Dickson Warehouse Waste.RAD

Individual Nuclide Soil Concentration
Parent Nuclide and Branch Fraction Indicated

Nuclide (j)	Parent (i)	THF(i)	S(j,t), pCi/g t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
Ac-227	Ac-227	1.000E+00	1.930E-02	1.857E-02	1.719E-02	1.312E-02	6.064E-03	4.069E-04	1.808E-07	3.347E-19
Ac-227	Pa-231	1.000E+00	0.000E+00	6.019E-04	1.733E-03	5.024E-03	1.040E-02	1.267E-02	7.529E-03	1.105E-03
Ac-227	U-235	1.000E+00	0.000E+00	6.406E-09	5.600E-08	5.632E-07	3.882E-06	2.011E-05	4.347E-05	2.296E-05
Ac-227	∑S(j):		1.930E-02	1.917E-02	1.892E-02	1.814E-02	1.647E-02	1.309E-02	7.572E-03	1.128E-03
Pa-231	Pa-231	1.000E+00	1.930E-02	1.925E-02	1.914E-02	1.878E-02	1.778E-02	1.467E-02	8.479E-03	1.244E-03
Pa-231	U-235	1.000E+00	0.000E+00	4.072E-07	1.215E-06	3.974E-06	1.129E-05	3.108E-05	5.399E-05	2.660E-05
Pa-231	∑S(j):		1.930E-02	1.925E-02	1.914E-02	1.878E-02	1.779E-02	1.470E-02	8.533E-03	1.271E-03
Pb-210	Pb-210	1.000E+00	2.480E-01	2.401E-01	2.250E-01	1.793E-01	9.370E-02	9.668E-03	1.469E-05	2.011E-15
Pb-210	Ra-226	1.000E+00	0.000E+00	1.274E-02	3.692E-02	1.093E-01	2.385E-01	3.230E-01	2.111E-01	3.994E-02
Pb-210	Th-230	1.000E+00	0.000E+00	1.651E-06	1.452E-05	1.491E-04	1.086E-03	6.592E-03	2.036E-02	3.865E-02
Pb-210	U-234	1.000E+00	0.000E+00	4.964E-12	1.315E-10	4.569E-09	1.036E-07	2.276E-06	2.159E-05	1.002E-04
Pb-210	U-238	9.999E-01	0.000E+00	3.522E-18	2.808E-16	3.280E-14	2.283E-12	1.763E-10	5.197E-09	6.841E-08
Pb-210	∑S(j):		2.480E-01	2.528E-01	2.619E-01	2.887E-01	3.333E-01	3.393E-01	2.315E-01	7.870E-02
Ra-226	Ra-226	1.000E+00	4.170E-01	4.160E-01	4.140E-01	4.072E-01	3.883E-01	3.287E-01	2.043E-01	3.864E-02
Ra-226	Th-230	1.000E+00	0.000E+00	1.073E-04	3.212E-04	1.062E-03	3.110E-03	9.556E-03	2.300E-02	4.067E-02
Ra-226	U-234	1.000E+00	0.000E+00	4.827E-10	4.330E-09	4.754E-08	4.136E-07	4.085E-06	2.654E-05	1.070E-04
Ra-226	U-238	9.999E-01	0.000E+00	4.561E-16	1.227E-14	4.481E-13	1.163E-11	3.762E-10	6.939E-09	7.456E-08
Ra-226	∑S(j):		4.170E-01	4.161E-01	4.144E-01	4.083E-01	3.914E-01	3.383E-01	2.273E-01	7.941E-02
Ra-228	Ra-228	1.000E+00	1.190E-01	1.053E-01	8.240E-02	3.496E-02	3.017E-03	5.698E-07	1.307E-17	0.000E+00
Ra-228	Th-232	1.000E+00	0.000E+00	1.350E-02	3.601E-02	8.270E-02	1.141E-01	1.171E-01	1.170E-01	1.168E-01
Ra-228	∑S(j):		1.190E-01	1.188E-01	1.184E-01	1.177E-01	1.172E-01	1.171E-01	1.170E-01	1.168E-01
Th-228	Ra-228	1.000E+00	0.000E+00	3.392E-02	6.386E-02	4.802E-02	4.555E-03	8.609E-07	1.974E-17	0.000E+00
Th-228	Th-228	1.000E+00	1.190E-01	8.283E-02	4.013E-02	3.177E-03	2.264E-06	2.189E-17	0.000E+00	0.000E+00
Th-228	Th-232	1.000E+00	0.000E+00	2.217E-03	1.477E-02	6.673E-02	1.126E-01	1.171E-01	1.170E-01	1.168E-01
Th-228	∑S(j):		1.190E-01	1.190E-01	1.188E-01	1.179E-01	1.172E-01	1.171E-01	1.170E-01	1.168E-01
Th-230	Th-230	1.000E+00	2.480E-01	2.480E-01	2.480E-01	2.480E-01	2.479E-01	2.477E-01	2.472E-01	2.452E-01
Th-230	U-234	1.000E+00	0.000E+00	2.229E-06	6.670E-06	2.202E-05	6.430E-05	1.953E-04	4.567E-04	7.599E-04
Th-230	U-238	9.999E-01	0.000E+00	3.159E-12	2.832E-11	3.107E-10	2.697E-09	2.644E-08	1.682E-07	6.415E-07
Th-230	∑S(j):		2.480E-01	2.480E-01	2.480E-01	2.480E-01	2.480E-01	2.479E-01	2.476E-01	2.460E-01
Th-232	Th-232	1.000E+00	1.190E-01	1.190E-01	1.190E-01	1.190E-01	1.190E-01	1.190E-01	1.189E-01	1.187E-01
U-234	U-234	1.000E+00	2.480E-01	2.473E-01	2.460E-01	2.413E-01	2.285E-01	1.889E-01	1.096E-01	1.628E-02
U-234	U-238	9.999E-01	0.000E+00	7.011E-07	2.092E-06	6.842E-06	1.944E-05	5.355E-05	9.321E-05	4.622E-05
U-234	∑S(j):		2.480E-01	2.473E-01	2.460E-01	2.413E-01	2.286E-01	1.889E-01	1.096E-01	1.633E-02
U-235	U-235	1.000E+00	1.930E-02	1.925E-02	1.914E-02	1.878E-02	1.779E-02	1.470E-02	8.533E-03	1.271E-03
U-238	U-238	5.400E-05	1.339E-05	1.336E-05	1.328E-05	1.303E-05	1.234E-05	1.020E-05	5.921E-06	8.817E-07
U-238	U-238	9.999E-01	2.480E-01	2.473E-01	2.460E-01	2.413E-01	2.286E-01	1.889E-01	1.096E-01	1.633E-02
U-238	∑S(j):		2.480E-01	2.473E-01	2.460E-01	2.413E-01	2.286E-01	1.889E-01	1.096E-01	1.633E-02

THF(i) is the thread fraction of the parent nuclide.

RESCALC.EXE execution time = 6.38 seconds

May 5, 2008

Mr. Mike Lacoe
Waste Management
444 Oxford Valley Road, Suite 220
Langhorne, PA 19047

Submitted US mail

RE: Disposal of Li Tungsten Superfund Site TENORM Impacted Soil in the GROWS/Tullytown Landfills

Dear Mr. Lacoe:

Safety and Ecology Corporation (SEC) has prepared this letter at the request of the Li Tungsten Cooperative Group to address the historical licensing or otherwise regulation of radioactive material on the Li Tungsten Superfund site. The Pennsylvania Department of Environmental Protection (PADEP) has requested we forward this letter to you concerning the Technologically Enhanced Naturally Occurring Radioactive Material (TENORM) impacted soil from the Li Tungsten Superfund Site in Glen Cove, New York, to be disposed of at the GROWS/Tullytown Landfills in Pennsylvania. Specifically, Mr. Ramesh Belani, PADEP, requested a letter from the EPA official overseeing this superfund site, and a State of New York Radiation official, and the project's professional engineer stating that actions of Li Tungsten that created this TENORM waste were never regulated by the NRC, DOE, AEC, or New York State radiation regulatory authority.

The Li Tungsten Superfund Site is located in the City of Glen Cove, Nassau County, New York, and includes the former Li Tungsten Corporation facility at Herbhill Road and Dickson Lane. As a result of processing of ores at the facility on the Li Tungsten property, and the subsequent handling of the byproducts of that processing, elevated levels of radiation and certain metals had come to be present at or in the vicinity of the Li Tungsten property. The property is approximately 26 acres.

From April 2006 to August 2007, activities based on a remedy selected in the 1999 Record of Decision (ROD) were performed on Parcels B and C of the Li Tungsten Superfund Site that included the excavation and segregation of contaminated soils. After the operation, approximately 1,500 cubic yards of soil containing very low levels of TENORM remained stockpiled in the Dickson Warehouse located on Parcel C of the Li Tungsten Superfund Site.

These very low levels of TENORM in soil are a byproduct of industrial processing of ores to extract the desired element, namely tungsten. The actions that created this TENORM waste were never regulated by the NRC, DOE, AEC, or New York State radiation regulatory authority."

If we can provide you with additional information at this time, or if you may have any questions, please do not hesitate to contact us.

Very truly yours,

Mr. Mike Lacoe
May 5, 2008

Safety and Ecology Corporation

Andrew J. Lombardo, C.H.P.
Director of Professional Services

Civil & Environmental Consultants, Inc.

George J. Haberman, P.E.
Senior Project Manager

Li Tungsten Cooperative Group
c/o TDY Industries, Inc.
Edgard Bertaut
1000 Six PPG Place
Pittsburgh, PA 15222-5479
(412) 395-3052 FAX (412) 394-3010
Mobile (301) 526-1710

June 6, 2008

Ms. June Newman
Waste Mgmt.
1000 New Ford Mill Rd.
Morrisville, PA 19067

RE: Li Tungsten Superfund Site, Glen Cove, NY – Approval #100095PAE
Request for Additional Tonnage

Dear Ms. Newman:

This correspondence is to request additional tonnage for the approval referenced above. The original approval was for 2,250 tons. However, approximately 200 tons remain on-site which require disposal at your facility. This additional material has already been characterized under the characterization sampling for the initial approval. The original quantity was determined by engineering estimates of the volume of the stockpile of soil, and used 1.5 tons per yard as the density of the material. Either the total volume or the density could have been estimated too low, which would explain the reason for the requested increase.

Please contact Tom Joyner, US Environmental, if you require further information regarding this request.

Sincerely,

Edgard Bertaut

Edgard Bertaut
Senior Environmental Manager

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 2
290 BROADWAY
NEW YORK, NY 10007-1866

May 12, 2008

Edgard Bertaut
TDY Industries, Inc.
c/o Allegheny Technologies
1000 Six PPG Place
Pittsburgh, PA 15222-5479

Re: Form U Submission WASTE MGMT OF PA TULLYTOWN FAC, LI TUNGSTEN COOP GROUP, EC# 68096

Dear Mr. Bertaut:

As part of your company's attempts to secure approval for disposal of wastes from the Li Tungsten Superfund site in Glen Cove, NY, in the GROWS/Tullytown Pennsylvania landfill, you've recently made me aware of a requirement of the Pennsylvania DEP; namely, letters from both the US EPA and the State of NY regarding the involvement of radiation regulatory authorities at the Site while it was an operating facility. Therefore, I am providing the following information which is to the best of my knowledge and primarily from EPA's in-house information regarding the Li Tungsten Superfund site.

The generation of technically enhanced naturally occurring radioactive material, or TENORM, wastes through the processing of ores at the former Li Tungsten facility while it was operational prior to 1985 was not an activity regulated by any Federal radiation regulatory authority. During the EPA's remediation of this site (from 1992-present), any TENORM wastes that have shown elevated levels of radiation have been routinely disposed of at US Ecology, an Idaho facility that is permitted to accept low-level radioactive wastes for disposal.

The 1,500 cy of stabilized D008 wastes that is the subject of the current request showed elevated levels of lead but radiation levels around the range of normal background. Based on this characterization, these wastes were deemed suitable for Subtitle D disposal after being chemically stabilized for lead.

Based on documents in EPA's possession, the Li Tungsten facility apparently did have a radioactive materials license from the NYS Department of Labor to work with thorium for the production of thoriated tungsten welding rods, wires and filaments. Apparently, this license was terminated in the early 1970's when operations involving thorium were discontinued. However, any radioactive wastes associated with these operations were disposed of during earlier phases of site remediation at off-site radioactive waste disposal facilities.

Finally, the NY State Department of Environmental Conservation (DEC) has indicated that "We would defer any letters to the State of Pennsylvania to the USEPA. While we have provided oversight to the project in the past, we are not the lead agency on the clean up efforts and since the materials are being sent to a PA landfill, it is up to the PA DEP to make any determinations on acceptance."

I trust that this letter provides you with the kind of information that you were requesting.

Sincerely,

Edward Als, Remedial Project Manager
Li Tungsten Superfund Site
NY Remediation Branch
Emergency and Remedial Response Division

cc: J. Calarie, URS

Li Tungsten Cooperative Group
c/o TDY Industries, Inc.
Edgard Bertaut
1000 Six PPG Place
Pittsburgh, PA 15222-5479
(412) 395-3052 FAX (412) 394-3010
Mobile (301) 526-1710

June 6, 2008

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Waste Mgmt.
1000 New Ford Mill Rd.
Morrisville, PA 19067

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Please contact Tom Joyner, US Environmental, if you require further information regarding this request.

Sincerely,

Edgard Bertaut

Edgard Bertaut
Senior Environmental Manager

Li Tungsten Cooperative Group
c/o TDY Industries, Inc.
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Request for Additional Tonnage

Dear Ms. Newman:

This correspondence is to request additional tonnage for the approval referenced above. The original approval was for 2,250 tons. However, approximately 200 tons remain on-site which require disposal at your facility. This additional material has already been characterized under the characterization sampling for the initial approval. The original quantity was determined by engineering estimates of the volume of the stockpile of soil, and used 1.5 tons per yard as the density of the material. Either the total volume or the density could have been estimated too low, which would explain the reason for the requested increase.

Please contact Tom Joyner, US Environmental, if you require further information regarding this request.

Sincerely,

Edgard Bertaut

Edgard Bertaut
Senior Environmental Manager